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ABSTRACT

A one-year general education course entitled "Man and Environment" has been developed at Miami-Dade Junior College, Florida. Basic framework for the course was built on the premise that an interdisciplinary, module-structured course represents one of the better approaches to planning environmental education curriculum. Material for the course may be found in "Man and Environment, Revised Curriculum", ED 056 930. Utilizing the modular form and topical areas of Man and Environment, this booklet, however, presents variations, or alternatives, for the modules. Twenty topical areas are covered: ecological imperatives; value systems--Ecological priorities; belief systems; the myths of technology; earth as an energy system; conservation of vital resources; population dynamics; urbanization: the living community; urban environment; water--supply, demand and pollution; air pollution; food and drug pollution; sound pollution; scenic pollution; wildlife and man; soil and man; intergroup tensions; impact of political systems; impact of economic systems; and media and the environment. Each section offers one to five alternatives, outlining an overview of the module, concepts to be developed, student objectives (learning activities), and a list of resource materials. Where appropriate, a chart is constructed indicating each concept, strategy for developing it, and suitable evaluation procedure. A bibliography is included. (BL)

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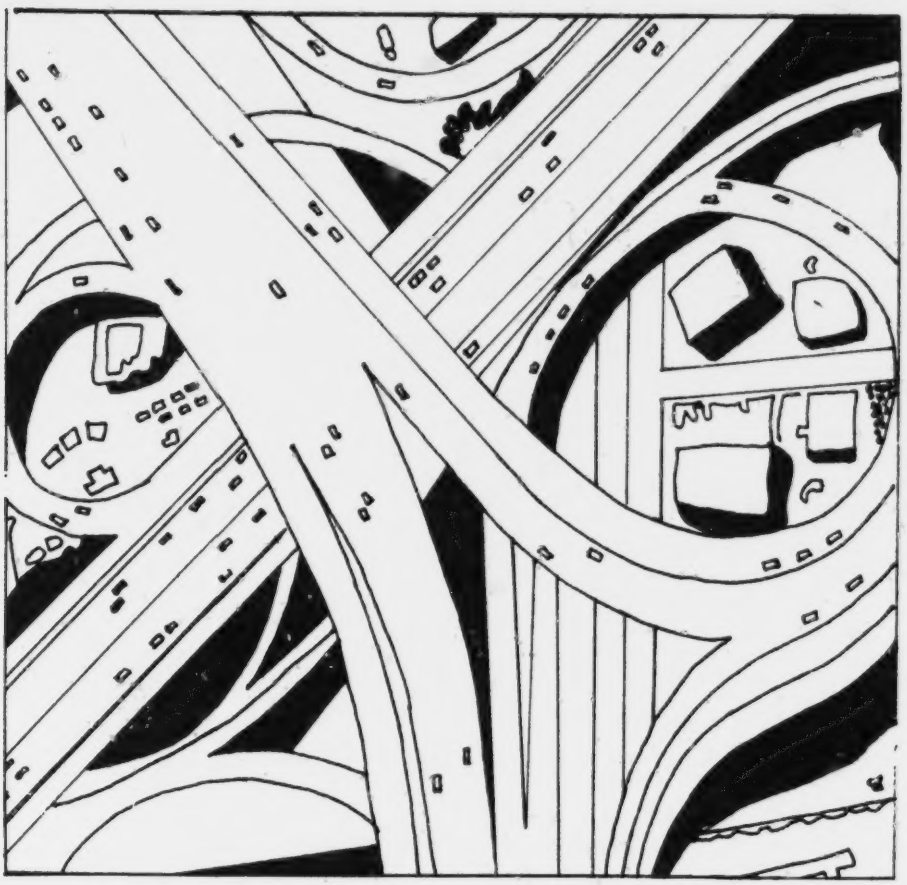

ENVIRONMENT

ENVIRONMENTAL EDUCATION

ALTERNATIVES

FOR

MAN & ENVIRONMENT

REVISED CURRICULUM

Pursuant to Grant Number 72-5790

A National Training Program in

Environmental Education

for

Faculty of Institutions of Higher Education

Conducted by

Miami-Dade Junior College

Miami, Florida

1972-73

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INTRODUCTION

A group of educators met in a workshop setting at Miami Beach, Florida July 17-28, 1972. This workshop was a primary focus for a project granted to Miami-Dade Junior College for 1972-1973. Funded by monies from the Education Professions Development Act, this project has sought to involve educators at the post-secondary level in developing understanding and in writing curriculum materials specific to environmental education studies.

The Environmental Education Act (PL 91-516) has emerged in answer to a serious concern for the state of our environment. In fact, it has been made quite clear that man's very survival will depend on developing a clear understanding of his relationship to the environment.

In the first annual (1970) report of the Council on Environmental Quality, President Nixon said:

> "We must seek nothing less than basic reform in the way our society looks at problems and makes decisions. Our educational system has a key role in bringing about this reform . . . It is also vital that our society develop a new understanding and a new awareness of man's relation to his environment - - what might be called environmental literacy. This will require the development and teaching of environmental concepts at every point in the educational process."

Since the enactment of PL 91-516, a series of questions have been raised in the planning process for environmental educational curriculum. Specifically, the questions have been faced by community colleges all across the nation. To answer this dilemma and, indeed, to develop at least the essentials of a curriculum appropriate for nationwide use, a group of community college environmental educationists and a number of consultants have designed a one-year general education course entitled Man and Environment.

The basic framework for this course has been built on the premise that an interdisciplinary, module-structured course represents one of the better approaches to planning environmental education curriculum.

The material presented in this booklet represents the writing efforts of the Miami-Dade Junior College EPDA workshop participants. Because the modular form and topical areas of Man and Environment have been used, the structure of this booklet is aligned in a similar manner but with variations - or alternatives - for the modules. As a result of time constraints within the two-week workshop period, this booklet is not representative of a complete set of alternatives. It is anticipated that additional writing will be done and sometime within the near future alternatives for all topical areas of Man and Environment will be available.

Decisions emerging out of group interaction are not easily come by. Therefore, we are indebted to the faculty participants who worked throughout the two-week workshop to accomplish their task. This booklet represents the best efforts of all groups working together toward a common goal; to make environmental education synonymous with "education". But it is education for a purpose. The environmental education process is dynamic - changing as the needs of society change. It must emphasize the continuation of the educational process throughout man's lifetime.

Alternatives

for

Man & Environment Revised Curriculum

ECOLOGICAL IMPERATIVES
Alternative #1

I. OVERVIEW

This module would attempt to convey (1) a clear understanding that man is an inseparable part of a system composed of men, culture and the natural environment, and that man's technology alters the interrelationships of this system; (2) an appreciation of the environment, both natural and manmade; (3) a fundamental knowledge of the problems confronting man, ways to solve these problems, and the need for citizen and governmental partnership in working out solutions, and (4) attitudes, ethical standards, and behavioral patterns which will foster citizen commitment and action to overcome the environmental crisis and to improve the quality of life in the 70's and 80's.

II. CONCEPTS

A. Man is an integral part of the environment. He must understand the interaction and interdependence of the elements which make up an Eco-system.
B. Man must understand the interrelationships between organisms and their environment.
C. In order to survive, man must conserve the finite renewable and non-renewable resources.
D. Man must learn to revise his short term value system to accommodate his long term needs.

III. STUDENT OBJECTIVES

A. The student will:
   1. Construct a food web with man as the top order consumer
   2. Describe a number of adverse environmental changes which would have immediate and/or cumulative impact on man as a species.

B. The student will:
   1. Construct an example illustrating man's involvement in the bio-geo-chemical cycle, (nitrogen),(H_2O),(CO_2),(C).
   2. Define Eco-system.
   3. Define Ecology.
   4. Describe three relationships that exist within any Eco-system.

C. The student will:
   1. Differentiate between renewable and non-renewable resources.
   2. List three renewable and three non-renewable resources.
   3. List four resources which may not be available fifty years from now.
   4. Identify four ways in which a resource you used yesterday might be better used tomorrow.

D. The student will:
   1. Describe an example of a civilization in which its means of success through environmental degradation brought it's downfall. (Ankor Wat)
   2. Describe how a country has improved its ecological balance, by using resource management.
      Forest management in Japan
      Israel
      Holland
   3. Describe a local example of how mismanagement of one resource has created an ecological crisis affecting future generations.

IV. RESOURCE MATERIALS

1. Detweiler, Thomas - Environment and Man (an anthology)
2. What is Ecology?
3. Eco-Sphere reprints of Scientific American articles.
4. Bio-Sphere reprints of Scientific American articles.
5. World Game - Buckminster Fuller (book)
6. Politics of Neglect (book)

ECOLOGICAL IMPERATIVES

CONCEPT	STRATEGY	EVALUATION
A. Man is an integral part of the environment. Man must understand the interaction & interdependence of the elements which make up an Eco-System. OBJECTIVE: 1. Describe a specified number of adverse environmental changes which would have immediate and/or cumulative impact on man as a species.	1. Prepare 2 case studies showing man's interdependence with the environment. Let one be the result of a "National" event such as earthquake or volcanic eruption with consequent disease, faminal, social migrations. Let the other be the long range consequences of man's activities.	

ECOLOGICAL IMPERATIVES

CONCEPT	STRATEGY	EVALUATION
B. Man must understand the interrelationships between organisms and their environment. OBJECTIVE: 1. Construct an example illustrating man's involvement in a bioziochemical cycle. 2. Define an Eco System. 3. Define ecology. 4. Describe 3 interrelationships that exist within any Eco System.	1. Work a food web "backwards" from whatever the student ate at his last meal. 2. Put a food web together based on what he knows about a specified geographical area. 3. Compare "food webs" for different cultures with different eating patterns (eskimo - vs. hindus or other vegetarian groups). 4. Verbally (or with film) trace CO_2 through the cycle including man's overload of CO_2 through combustion of fossil fuels. 5. Trace a water drop from a snowflake in Minnesota to a mild solution of sulfuric acid in Philadelphia. 6. Identify the waste products from fossil fuels (combustion) and trace these by products. 7. Give a defined geographical area, let the student identify ecological relationships in that area (go into the back yard).	

CONCEPT	STRATEGY	EVALUATION
Concept B (continued) Objective 1-4 (continued)	8. Bring in a praying mantis to eat a grasshopper. 9. Examine parts of an eco system (consumers, producers, competition) -- manipulate & order the components to construct a model. 10. Game strategies & simulation -- "Extinction" -- predator - pray relationships. Other games: Man & His Environment game, Pollution Game. 11. Cut up paragraphs from essay -- give to students - let them reassemble in some order.	

ECOLOGICAL IMPERATIVES

CONCEPT	STRATEGY	EVALUATION
C. In order to survive man must conserve resources because many of them are finite and/or non-renewable. OBJECTIVES: 1. Differentiate between renewable and non-renewable resource. 2. List 3 renewable and 3 non-renewable resources. 3. List 4 resources which may not be available 50 years from now. 4. Identify 4 ways in which resources used today might be better used tomorrow.	2. Using current present rate utilization and estimated reserve, estimate date when resource will be expended. 3. Create a situational play for what life will be like when we run out of fossil fuels -- what are the long term of consequences of the loss -- what effect on establishing priorities in usages, etc. - from the perspective in hindsight. 4. Role play conflicting interests in setting priorities for use of fossil fuels (industry, consumer, power companies, drug manufacturers, etc.) 5. Develop the Space Ship Earth concept - compare to long range space travel - recycling, waste disposal, etc.	

ECOLOGICAL IMPERATIVES

CONCEPT	STRATEGY	EVALUATION
D. Man must learn to revise his short term value system to accommodate his long term needs. OBJECTIVES: 1. Describe an example of a civilization in which its means of success through environmental degradation brought its downfall. (Ankor Wat) 2. Describe an example of how a country using resource management re-established an ecological balance. (Forest management in Japan) (Israel) (Holland) 3. Describe a local example of how mismanagement of one resource has created an ecological crisis affecting future generations.	1. Show slides of Mediterranean basin & Northern African areas that are now "semi-sterile" that were once biologically productive (forest or grasslands to desert -- discuss the role of man). 2. In small groups, let students design a strategy to illustrate Concept D. Each group would use a different value to be identified by the group.	

ECOLOGICAL IMPERATIVES
Alternative #2

I. OVERVIEW

This module would attempt to convey (1) a clear understanding that man is an inseparable part of a system composed of men, culture and the natural environment, and that man's technology alters the interrelationships of this system; (2) an appreciation of the environment, both natural and manmade; (3) a fundamental knowledge of the problems confronting man, ways to solve these problems, and the need for citizen and governmental partnership in working out solutions, and (4) attitudes, ethical standards, and behavioral patterns which will foster citizen commitment and action to overcome the environmental crisis and to improve the quality of life in the 70's and 80's.

II. CONCEPTS

A. There is an interrelationship among men, culture and the natural environment.
B. Technology can alter the interrelationship among man, culture and the natural environment.
C. Man must develop an appreciation of the environment both natural and manmade.
D. Individuals and governmental agencies must work together to recognize and solve environmental problems.
E. Changing attitudes, ethical standards and behavioral patterns will help to prevent future environmental crises.

III. STUDENT OBJECTIVES

A. The student will:
   1. Define "culture."
   2. Debate the merits of a farming culture similar to that in the U. S. in the early 1900's as this relates to the natural environment.
   3. Debate the merits of an industrial culture as exemplified in the U. S. since World War II as this relates to the natural environment.
   4. Discuss the effects of imposing a particular alien culture on a natural environment.
   5. Describe two coastal changes which have resulted from inland development.
   6. Examine the effects of an up-river industrial community on a down-river natural environment.

B. The student will:
   1. Describe what the pollution problem would be like if it weren't for automobiles.
   2. Describe how the automobile is polluting our air, giving one technological solution to the problem.
   3. Describe the number and types of non-returnable containers, after observation on a local street.
   4. Describe two ways in which our demand for electrical power has changed man's culture and the natural environment.
   5. Explain how large-scale scientific farming has enabled our country to grow more food than it needs but how monobiotic farming can bring disaster.
   6. Explain how sewage treatment systems have enabled man to recycle water and have helped to keep the environment cleaner.

C. The student will:
   1. Define a natural environment.
   2. Give examples of four man-made environments.
   3. Outline the major components of a natural environment.
   4. Discuss a coastal salt marsh as a natural environment vital to man.
   5. Examine and give a written report on a local natural environment.
   6. Select and visit an example of a virgin natural environment.

D. The student will:
   1. Define the functions of a political system insofar as these pertain to man and the environment.
   2. Describe the types of environmental problems dealt with by governmental agencies.
   3. Compare specific responses of the political systems of the U.S. and the Soviet Union to three environmental problems.
   4. Propose three alternative positive responses that could be effective in solving environmental problems in the U.S.
   5. Discuss the individual actions that could be effective in influencing governmental response to environmental problems.
   6. Propose three ways that community colleges can be a catalyst for solving community environmental problems.

E. The student will:
   1. Describe man's historical rationale concerning unrestricted utilization of his environment.
   2. Discuss the attitudes of two societies exhibiting a compatibility with the environment.
   3. Discuss three alternatives to those beliefs which are presently incompatible with a harmonious eco-system.
   4. Discuss in a small group, ethical standards which will help to improve the environment.
   5. Discuss, in a small group behavioral patterns which will help to improve the environment.

6. Discuss in a small group, attitudes most likely to assist in improvement of the environment.

IV. RESOURCE MATERIALS

Films
1. "What Are We Doing To Our World"
2. "The End of One"

VALUE SYSTEMS - ECOLOGICAL PRIORITIES
Alternative #1

I. OVERVIEW

This module is designed to show that at the base of our present chaotic world situation there lies a deeper crisis - a value crisis. In order to describe and make this relevent to the present generation of students, it is necessary to begin where they and we are (in the chaotic present). We must illuminate or highlight pertinent examples of this chaos searching for historical antecedents, relating these to the present and suggesting alternative paths toward an ecologically sound future.

II. CONCEPTS

A. Historically, man has valued expediency in attaining his goals without regard to his environment.
B. Historically, man has valued the profit motive and the acquisition of material wealth more than his environment.
C. Historically, man has valued pleasure regardless of its effects on the environment.
D. In that man has a profound effect on his environment, man to some degree can control his destiny.

III. STUDENT OBJECTIVES

A. The student will:
   1. List five examples of economic expediency, with each example illustrating the detrimental effects on the environment.
   2. List five examples of political expediency, with each example illustrating the detrimental effects on the environment.
   3. Record his activities for a week, taking note of these activities which were both expedient and detrimental to his environment.
   4. Analyze at least one example of political, economic, or personal expedient practices which have had detrimental effects on the environment. The analysis will include:
      a. a complete description.
      b. the short range effects on the environment.
      c. the long range effects on the environment.
   5. Propose alternatives for at least three examples of expedient behaviors on practices. These alternatives must take into account:
      a. feasibility
      b. practicality
      c. effect on the environment.

B. The student will:
   1. Give at least three definitions of the profit motive as described by three different authors in Western society.
   2. Cite examples of man's attempts to give theological bases for the profit motive.
   3. Conduct an open-ended interview with specific reference toward the profit motive with three religious leaders (Jewish, Protestant, and Catholic).
   4. Determine to what extent the profit motive operates in his life, citing specific examples of acquisitions or actions which are detrimental to the environment and which do or do not contribute to the profit motive.
   5. List five personal possessions that either directly or indirectly contribute to the deterioration of the environment.

C. The student will:
   1. Write a brief essay (one typewritten page) to explain how the shorter work week and longer work week have contributed to
      a. decreasing environmental quality
      b. increasing environmental quality
   2. Evaluate the relative values of the shorter and longer work week reporting orally to his instructor in a personal conference.
   3. Discuss in a ten minute oral presentation to the class the history of property rights and land use practices relative to the development of recreational sites. He will consider:
      a. marshlands
      b. offshore islands
      c. seashore

D. The student will:
   1. List three scientific discoveries in the twentieth century which have had far-reaching positive effects on the quality of life on this planet. List five negative effects for each of the three which were also the result of the same discoveries. Example: nuclear fission.
   2. Build a scale model of the ten block area of your neighborhood changing ten characteristics in the model which, in your opinion, prove to be improvements in the quality of that environment.
   3. List five ways in which man has affected his environment to such a degree that his unborn children will have to pay for their ancestors' actions.
   4. Extrapolate, from legislative action approved in the last twenty years, four specific actions that prove man is capable of controlling the environment to some degree.

VALUE SYSTEMS - ECOLOGICAL PRIORITIES
Alternative #2

I. OVERVIEW

This module is designed to show that at the base of our present chaotic world situation there lies a deeper crisis - a value crisis. In order to describe and make this relevant to the present generation of students, it is necessary to begin where they and we are; To illuminate or highlight pertinent examples of this conflict and then to search for historical antecedents relating these to the present and suggesting alternative paths toward an ecologically sound future. Additionally, this module should provide opportunities for the student to identify and clarify his current values.

II. CONCEPTS

A. A multiplicity of conflicting value systems exists within varying cultures throughout the world.
B. Our environmental actions (individual and societal) are the result of the values (value systems) we and our society accept.
C. Many values we hold are the result of institutional influences: historical, environmental, religious, political and other societal factors.
D. Some currently accepted values are in conflict with responsible environmental action.
E. The environmental crisis obliges man to re-examine his values and adapt them to solving the problems of man's survival.

III. STUDENT OBJECTIVES

A. The student will:
   1. Identify differences that exist between conflicting value systems of the Peruvian and the American as they pertain to agricultural procedures.
      a. sketch a diagram of agricultural garden plots in each system.
      b. describe agricultural practices in each.
      c. cite advantages of each.
   2. Identify one economic, one political, one sociological, one spiritual value personally believed relating to personal interaction with the environment.
   3. Describe two value systems in the U.S. which are in conflict with the maintenance of a viable environment.
   4. Order the environmental values personally held and in the rank which are personally important.
   5. Identify the difference between Chinese and American value systems with regard to environmental attitudes.

B. The student will:
   1. List five actions taken this morning that impinge upon the environment (such as a coffee break) and defend each action in terms of our values.
   2. Describe five TV commercials which attempt to create conflicting values detrimental to the environment.

C. The student will:
   1. Describe three (historical) (environmental) (religious) (political) values which demonstrate man's continuing exploitive view of his interaction with environment.
   2. Compare a political system which is predicated upon exploitive use of the environment with one which makes wise use of the environment.
   3. Contrast the values held by the Catholic Church towards birth control with those held by the zero population group.

D. The student will:
   1. Describe how "keeping up with the Jones" can destroy all hope for a balance with nature.
   2. Describe three business practices in vogue in American society which are in direct conflict with environmental concerns.

E. The student will:
   1. Write an essay to compare the impact of value systems which characterize the people of two selected works, (e.g. Orwell's 1984, Skinner's Walden II, Beyond Freedom and Dignity, Vonnegut's Player Piano, Reich's Greening of America, and Toffler's Future Shock.)
   2. Outline four precepts or practices (one each of spiritual, economic, social and political) which could be applied in personal life to increase chances of survival.
   3. You have been appointed the Director of the Environmental Protection Administration by President Nixon. You have been asked to issue a statement to the Congress concerning five values which we must have in order to enable man to conquer environmental problems and to insure man's survival. Please draw up such a statement.

IV. RESOURCE MATERIAL

Films:
1. The Ark, 16mm - 20min. color
2. Values & Goals: A Way to Go, 16mm - 20 min. color
3. Tragedy of the B.S.C.S., 16mm - 30 min. color
4. The Time of Man, 16mm - 60 min. color

Books: 1984 by George Orwell

Books (continued): The Population Bomb, Paul Ehrlich
Player Piano, Vonnegut
Waldon II, Skinner
Beyond Freedom & Dignity, Skinner
Future Shock, Toffler
The Hidden Dimension, Edward

Games: The Pollution Game
Extinction

VALUE SYSTEMS - ECOLOGICAL PRIORITIES
Alternative #3

I. OVERVIEW

For the most part, the history of the twentieth century indicates that technologically advanced societies have regarded a steadily improving standard of living for the masses (based upon economic growth and industrial development) as their main collective value. Ecological considerations have had a low priority among societal values. Consequently, the quality of man's environment has degenerated because societies have failed to reckon with the long range consequences imposed by their hierarchy of values.

II. CONCEPTS

A. Interrelationships between value systems and ecological decisions should be a basis for setting priority.
B. There is a hierarchy of values that affects environmental decisions.
C. New values must be compatible with a single enclosed eco-system.
D. Alternative decisions should be based upon a careful analysis of economical, aesthetic, social and environmental costs and benefits.

III. STUDENT OBJECTIVES

A. The student will:
   1. Survey persons in his neighborhood for evidence of changes in attitudes toward ecological problems in the community.
   2. List five values reflective of his community and indicate the impact of each upon the environment.
   3. Evaluate the rationale for and the environmental impact of a major commumity project, noting the value judgements made.

B. The student will:
   1. Establish a hierarchy of values that might have led to a specific local environmental decision.
   2. Rank six political decisions that affected the environment, using his own hierarchy of environmental values.
   3. Evaluate the values that were used in the design of a specific and completed renewal program.
   4. Rank a list of projects having environmental impact, and from evidence in his community, point out where his priorities differ from those of the community.

C. The student will:
   1. Analyze an international document concerning ecology for evidence of a unit of values.
   2. Develop a statement of the potential environmental impact of international action.
   3. List one change in environmental values that has taken place on earth during the preceeding decade.

D. The student will:
   1. Analyze economic, aesthetic, societal and environmental costs and benefits of environmental actions at local, state, regional, national and international level.
   2. Identify the way man's role has slipped from dominion to stewardship.
   3. List five examples of progress not accomplished at the expense of the environment and specifically impinging on natural resources.
   4. Cite two instances in the local community of evidence indicating that drastic modifications must be made in current analysis of the societal and environmental costs and benefits.
   5. Give an example of a manmade substance that has had a global impact on the environment.
   6. Give an example of an action by man that has had a global impact on the environment.
   7. Critique an article in a periodical concerning a worldwide "eco-issue."

BELIEF SYSTEMS
Alternative #1

I. OVERVIEW

Man has traditionally viewed himself as master of the environment. Religious tradition and governmental institutions have been been based on this view of man as the dominant force in the eco-system.

We will demonstrate in this module that man is capable of managing his environment by developing an informational base and by making appropriate environmental management decisions.

II. CONCEPTS

A. Western tradition equates progress with growth.
B. Man has traditionally felt that nature is his adversary
C. Accumulation of economic resources has traditionally been a primary goal of man.
D. Aesthetic values have always existed in our society.
E. The clash of economic benefit to aesthetic values is a key to understanding our ecological crisis.
F. Man is part of man's environment. Man not only alters nature but also the other men he finds in the environment.
G. Man adapts his environment to himself instead of himself to environment.

III. STUDENT OBJECTIVES

A. The student will:
   1. Evaluate historical growth patterns within his environment as these relate to:
      a. population growth trends
      b. housing development
      c. industrial growth
      d. insttutional growth
   2. Correlate world population growth patterns with economic and technical progress.
   3. Differentiate between concepts of growth held by Western and Eastern culture.

B. The student will:
   1. Develop understanding of man's minute role as a biological entity in the primitive natural environment and the consequent "paranoid" feelings.
   2. Abstract statements taken from the suggested Bibliography as examples of the adversity between man and his environment. Arguments in opposition to the above point of view will be made by the student.

C. The student will develop an understanding of man's traditional "greed".
D. The student will tour the community and list both "beautiful" and "ugly" buildings (public).
E. The student will develop a folder of news items clipped from newspapers of previous week to exemplify the "clash".
F. The student will describe the effects (on the environment) of new buildings presently under construction in the community.

BELIEF SYSTEMS
Alternative #2

I. OVERVIEW

The rationale for the role of man and his relation to the environment has its ultimate basis in a system of beliefs. Belief systems vary from culture to culture.

II. CONCEPTS

A. Some belief systems view man as an ecological dominant.
B. Other belief systems view man as part of a larger whole - interacting with but not dominant over.
C. There is a relationship between belief systems and the institutions of society.
D. Belief systems need to be evaluated, interpreted and adopted to allow man to live in harmony with the environment.

III. STUDENT OBJECTIVES

A. The student will:
   1. Cite after a lecture, three examples of anthropocentric societies and discuss in a short paragraph ways in which the environment is affected.
   2. Discuss the ecological consequences of the Judeo-Christian belief system.
   3. Discuss the emergence of the materialistic ethic in:
      a. the United States
      b. other nations

B. The student will list three examples of non-anthropocentric belief systems and describe during a class discussion how man and the environment is viewed in each.

C. The student will:
   1. Understand the concept of an institution, through readings, discussions and lectures.
   2. List five major institutions and show how they relate to the belief system.
   3. Describe in a paragraph how these institutions influence the environment.
   4. Describe in a paragraph how the environment affects the institution.

D. The student will:
   1. Examine, using various resource materials, societies which have failed because their belief systems and institutions failed to cope with environmental realities.

2. Evaluate and discuss orally, using handouts and class notes, present life-styles and their effect on the environment.
3. Evaluate and discuss the ecological "soundness" of existing life styles in the light of experiences of past societies.
4. Propose in an essay a hypothetical belief system, which incorporates an environmentally literate life style.

IV. RESOURCE MATERIALS

1. Books
2. Films
3. Daily newspapers
4. Magazines

THE MYTHS OF TECHNOLOGY
Alternative #1

I. OVERVIEW

This module presents a definition, discussion, examination and analysis of the myths of technology. It attempts to develop a questioning analytical attitude toward statements which are indeed "myths".

Economic growth increases material wealth, but it has a growing number of unfortunate side effects - each individual tries to increase his own benefits within an increasingly crowded environment. Growth is as deeply entangled in our economic thinking as rain dancing is in other societies.

Too often technological progress has been equated with growth, change, exploration rather than a real improvement in the quality of life.

Technology has the wherewithal to reduce the degradation of the environment. The question is posed as to how industry can be made to do this with least disruption to mankind.

II. CONCEPTS

A. The future of man depends upon the public knowledge of the limitations and capabilities of technology.
B. Technological change has both beneficial and detrimental effects on the quality of life.
C. Man's survival is endangered by the misuse of technology.
D. The utilization of technology must be reviewed in terms of human value, social impact and the consequence.

III. STUDENT OBJECTIVES

A. The student will:
   1. Give an illustration (place, date, time, participants, issues, etc.) of a political entity in the local community accepting a destructive technological proposal because of lack of public organization, apathy or economic pressure.
   2. Give an illustration (place, time, date, participants, etc.) of a political entity in local community resulting in favor of a destructive technological proposal and disregarding sound ecological evidence and public outcry.

B. The student will:
   1. Cite specific examples of a recent technological development potentially beneficial and detrimental to the quality of life.
   2. Delimit the benefit to our society of strip-mining by technological means as opposed to the disadvantages. Include ecomonic, ethical, industrial factors in response.

C. The student will:
   1. Describe a hypothetical day in the life of a student his own age in the year 2000 assuming that man's current reliance upon technology continues.
   2. Describe possible biological adaption man would have to evolve in order to survive his environment if the present rate of pollution continues.

D. The student will:
   1. Write a report on the need for water in local community for the next 25 years, taking into account population trends, aesthetics of recycling industrial consumption, personal needs and financial costs.
   2. Outline personal sacrifice to be made in order to alleviate and maintain a positive environment.
   3. Write a three page essay on the idea of humanizing technology as suggested by some contemporary writer (ex. Fromm's Revolution of Hope).

IV. RESOURCE MATERIALS

1. Visitations to Industry
2. Education of Henry Adams
3. The Broken Image - Floyd Matson
4. One Dimensional Man - Herbert Marouse
5. Ordeal of Change - Eric Hoffer
6. Novels - Charles Dickens
7. The Act of Creation - Koestler

EARTH AS AN ENERGY SYSTEM
Alternative #1

I. OVERVIEW

The following is a direct quote from: Resources and Man, Committee on Resources and Man, Natural Academy of Sciences, Natural Research Council, W.H. Freeman and Company, 1969, Page 157.

"Into and out of the earth's surface environment there occurs a continuous flux of energy, in consequence of which the material constituents of the earth's surface undergo continuous or intermittent circulation. By far the largest source of this energy flux is solar radiation, a small fraction of which is captured by the leaves of plants and stored as chemical energy. This chemically stored solar energy becomes the essential biological energy source for the entire animal kingdom. In particular, it supplies the energy required as food for the human population.

During geologic history, a minute fraction of the organic matter of former plants and animals became buried in sedimentary sands, muds, and limes, under conditions of incomplete oxidation. This has become the source of our present supply of fossil fuels - coal, petroleum and natural gas."

II. CONCEPTS

A. The sun is the earth's primary energy source.
B. Non-biological energy flows affect life on earth.
C. The energy flow through the eco-system is very important to life on earth.
D. There are alternative sources of energy that are potentially available to man.

III. STUDENT OBJECTIVES

A. The student will:
   1. Define energy
   2. Discuss the relationships of the earth to the sun, specifically the amount of energy received and distributed from the sun.
   3. List three forms of solar energy affecting the earth.
   4. Identify and explain at least one factor which affects the receipt of solar energy.
   5. Prepare a bar graph showing the different sources of energy affecting the earth and indicating their relative importance.

6. Explain the earth's ability to retain and radiate heat.
7. Construct a diagram showing the distribution of solar energy by the earth's system.

B. The student will:
1. Diagram the hydrologic cycle.
2. Explain the following terms: evaporation, condensation, transpiration and precipitation.
3. Define conduction, radiation, convection and advection.
4. Explain the effects of conduction, radiation, convection, and advection on the biosphere.
5. Discuss two factors that upset energy receipt and distribution.
6. Discuss in a small group how non-biological energy systems affect life in their community.

C. The student will:
1. Name and discuss briefly the physiological process by which solar energy enters the biosphere.
2. Construct a chart showing the energy flow through an aquatic and/or terrestrial eco-system.
3. Discuss the value of decomposer orgainsms to the flow of energy in the biosphere.
4. Explain how O_2 demand by living orgainsms is related to the energy flow through them.
5. Write a two page paper outlining the formation, storage, and use or expenditure of a fossil fuel.
6. Estimate, given certain data about present population growth, usage and supply, the decade when one of the fossil fuels will be completely expended.

D. The student will:
1. List four alternative energy sources that are potentially available to man.
2. Describe the utilization of each source and explain the economic feasibility of each.
3. Explain the process in the formation of each of these sources.
4. Explain the pollution consequences of each of these sources.
5. Discuss the present reserves and future consumption of each of these sources.
6. Write a 1,000 word essay on the future problems of energy sources and possible solutions.

EARTH AS AN ENERGY SYSTEM
Alternative #2

I. OVERVIEW

The earth is an open energy system and all processes of the earth require energy expenditure. This constant flux of energy in process is the "name of the game". The rules cannot be changed in any way to avoid the fact that man can only "lose" in his utilization of energy resources. Most energy available to man, including biological functioning, comes directly or indirectly from the sun. Man converts energy to suit his needs. In this process wise management is essential in order to "cut down his losses".

II. CONCEPTS

A. All processes of the earth require energy. Since energy is the "name of the game", man must realize that he can't win or draw but only lose in his utilizations of energy resources.
B. The earth is an open energy system.
C. Most energy available to man comes directly or indirectly from the sun, with man changing its form to suit his needs.
D. Biological systems are energy dependent.

III. STUDENT OBJECTIVES

A. The student will:
   1. Diagram the energy flow and the growth - decay cycle of an animal and plant. ie. corn, wheat.
   2. Explain energy flow in the manufacture and use of a battery.
   3. Describe the food vs. body weight relationship to illustrate the "Law of Conservation of Energy".
   4. Explain why a room air conditioner does not extract as much heat from the room as it rejects to the outside air, and describe the immplication of this on the environment.

B. The student will:
   1. Diagram to explain what is meant by earth as an open energy system.
   2. Explain some processes by which the earth maintains a narrow range of temperature equilibrium.

C. The student will:
   1. Describe the difference between direct solar and indirect solar energy.

2. Diagram and explain one type of energy conversion of nuclear to electrical energy.
3. List examples of how gravitational energy can be utilized by man.
4. Trace energy conversion from fossil fuel through food preparation.
5. List at least five different energy forms found within his home, giving the source of these.
6. Discuss unavoidable losses in the production of electric power.
7. Write "ten commandments" for intelligent energy use within his home.

D. The student will:
1. List the raw materials required for photosynthesis and describe the role of chlorophyl as a light trap.
2. Describe the concept that respiration is the reverse of photosynthesis, in an energy sense.
3. Contrast anaerobic and airobic respiration in terms of energy transfer.
4. Defend or refute the statement that ATP is the universal energy currency for the cell.
5. Construct a food pyramid or a food chain to illustrate the bioenergetics of an eco-system.

IV. RESOURCE MATERIALS

1. Sept 1971 - "Scientific American" Power & Energy - Complete Edition.
2. July 1972 - "Scientific American" Article on Fusion Power

EARTH AS AN ENERGY SYSTEM

CONCEPT	STRATEGY	EVALUATION
CONCEPT A All processes of the earth require energy and since energy is the name of the game, man must realize that he can't win or draw but only lose in his utilizations of energy resources. OBJECTIVES: 1. The student will be able to show by diagram the energy flow in the growth-decay cycle of an animal or plant, i.e., corn wheat, rabbit.	1. Research from prepared list. 2. A/V Presentation 3. Laboratory observation on food chains 4. Diagram of energy flow in a food chain.	1. Creative expressions 2. Individual conferences 3. Projects
2. The student will be able to discuss energy flow in the manufacture and use of a battery.	1. Research from prepared list on chemistry and physics of battery. 2. Demonstration of battery construction. 3. A/V Presentation. 4. Research paper.	1. Peer Evaluation 2. Term Paper 3. Oral or written individual report 4. Homework

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (continued) OBJECTIVES:		
3. The student will be able to use the food vs. body weight relationship to illustrate the "Law of Conservation of Energy."	1. Personal data evaluation from food intake and body weight over 1 week to 1 month period. 2. Research on food vs. body weight relation. 3. A/V 4. Compare the amount of wheat required to produce 1 pound of body weight, taken directly or through beef.	1. Term Paper 2. Written Report 3. Project 4. Worksheets, Notebooks
4. The student will be able to explain why a room air conditioner does not extract as much heat from the room as it rejects to the outside air, and explain the effect on the environment.	1. Research on power consumption vs. cooling capacity of air conditioning units. 2. Laboratory experiment with refrigeration system. 3. Diagram of energy balance for the system	1. Term Paper 2. Oral or written report 3. Individual conference

EARTH AS AN ENERGY SYSTEM

CONCEPT	STRATEGY	EVALUATION
CONCEPT B The earth is an open energy system. OBJECTIVE: 1. The student will be able to illustrate by means of a diagram what is meant by an open energy system. 2. Explain at least two processes by which the earth maintains a narrow range of temperature, equilibrium.	1. Student forum on the consequences of a "closed" energy system earth 2. Construction of diagram 3. A/V Presentation 1. Research from prepared list 2. Laboratory demonstration of heat transfer processes	1. Term Paper 2. Drawing 3. Project 1. Oral or written report 2. Group Report 3. Drawing 4. Project

THE EARTH AS AN ENERGY SYSTEM

CONCEPT	STRATEGY	EVALUATION
CONCEPT C Most energy available to man comes directly or indirectly from the sun and man changes its form to suit his needs. OBJECTIVES:		
1. The student will be able to distinguish between direct and indirect solar energy.	1. Research from prepared list or uses of direct and indirect solar energy. 2. Demonstration of utilization of both types of solar energy 3. Student forum 4. Research paper	1. Term paper 2. Oral or written report 3. Homework
2. The student will be able to show the mass and energy balance for at least one type of conversion of nuclear to electrical energy.	1. Research from prepared list 2. Student lecture with diagrams and flow chart or simple model 3. Research paper	1. Drawings 2. Homework 3. Term Paper 4. Oral or written report

CONCEPT	STRATEGY	EVALUATION
CONCEPT C (continued) OBJECTIVES:		
3. The student will be able to give examples of how gravitational energy can be utilized by man.	1. Research from prepared list 2. Construction of drawings or models, i.e., water wheels, hydroelectric plants 3. Student measurements of tides	1. Project 2. Creative expression 3. Individual conference
4. The student will be able to trace the conversion of energy from a fossil fuel to preparation of food.	1. Student presentation with flow charts 2. Laboratory demonstration	1. Creative expression 2. Term Report 3. Oral or written report

CONCEPT	STRATEGY	EVALUATION
CONCEPT C (continued) OBJECTIVE: 5. The student will be able to list at least five different energy forms within his home and where they come from.	1. Personal inspection with any required research. 2. Student forum for comparison between different homes 3. Written analysis of the effect of removing any three energy sources for the student home.	1. Term paper 2. Peer Evaluation 3. Creative Expression 4. Oral or written report 5. Homework
6. The student will be able to discuss the unavoidable losses in the production and distribution of electric power.	1. Research from prepared list on power plant efficiency, turbine efficiency, transmission losses, etc. 2. Class discussion 3. Attitude survey	1. Term paper 2. Oral or written report 3. Creative expression 4. Project 5. Homework
7. The student will be able to write "Ten Commandments" for intelligent use of energy in his home.	4. Trace changes in public & personal attitudes toward the use of energy. 5. The student will decide, if his survival in a cold climate depended on a single candle, would he burn it or eat it. Why?	1. Oral or written report 2. Project

CONCEPT	STRATEGY	EVALUATION
CONCEPT D Biological systems are energy dependent. OBJECTIVE:		
1. List the raw materials required for photosynthesis and describe the role of chlorophyl as a light trap.	1. Laboratory experiment demonstrating photosynthesis.	1. Oral or written report 2. Creative expression 3. Peer evaluation 4. Project
2. Justify the statement that respiration is the reverse of photosynthesis.	1. Research 2. Laboratory studies 3. Diagram 4. Flow chart	1. Term paper 2. Homework 3. Project 4. Creative expression
3. Contrast aerobic and anaerobic respiration in terms of energy transfer.	1. Research 2. Diagram 3. Flow chart	1. Creative expression 2. Term paper 3. Oral or written report
4. Defend or refute the statement that ATP is the universal energy currency for a call.	1. Research 2. Forum discussion	1. Term paper 2. Oral or written report 3. Peer evaluation
5. Illustrate the bioenergetics of an eco-system by constructing a food pyramid or food chain	1. Research 2. Diagram 3. Flow chart 4. Demonstration	1. Creative expression 2. Term paper 3. Homework 4. Observation

EARTH AS AN ENERGY SYSTEM
Alternative #3

I. OVERVIEW

The earth is essentially a closed energy system which operates because of a constant energy input from the sun. Because of the inherent inefficiency of such transfer, thermal pollution becomes a problem.

II. CONCEPTS

A. Energy acquisition and utilization has traditionally determined the developmental course of civilization.
B. Energy from the sun is modified and transferred in the ecosystem.
C. As energy flows from one level to another a degradation occurs in a reduced amount of usable energy within a defined system. (second law of the thermodynamier.)
D. Man's manipulation of energy operates within the constraints of the second law of Thermodynamics which results in excess heat released in the environment.
E. Man's consumption of energy resources is increasing at an exponential rate resulting in significant environmental thermal effects.

III. STUDENT OBJECTIVES

A. The student will:
   1. Describe the major cultural steps in the development of human society in terms of the dominant energy source(s) utilized in each of the following:
      a. Hunter - Gatherer
      b. Agrarian
      c. Industrial
      d. Post Industrial
   2. Describe at least five events that altered the development of man as a result of an increase in man's utilization of energy
   3. Construct a map of coal and water power resources, correlating the resources with industrial - social activity.
   4. Develop two theories regarding how energy changes influenced the start of the industrial revolution.
   5. Describe the historical interrelationships of human population growth pattern with man's technological ability to harness energy.

6. Compile a short list of "developed" nations and identify the energy sources providing the historic and current basis for development.
7. Parallel the development of energy sources with the growth of the U.S. as an industrial nation.

B. The student will:
1. Explain how the energy from the sun is released when coal is burned.
2. Diagram the cyclic activities which demonstrate the changing form of solar energy sources in plant-animal communities and human fuel consumption activities.
3. Diagram the major energy flows into, through, and out of the earth's biosphere and the overall eco-system.
4. Describe the steps used by the plant kingdom to transfer sun's energy to chemical energy.

C. The student will:
1. Project immediate action if his continued existence, at least momentarily in a cold climate, depended only on a candle, whether to eat it or burn it.
2. Research and estimate how much heat loss to a particular system is incurred when:
   a. Fossil fuel such as coal is burned to provide electrical energy.
   b. Nuclear fuel (uranium & platinum) are used to provide electrical energy.
   c. Waterpower
   d. Solar energy is converted to electricity.
3. Describe the second law of thermo-synthetics, stating the implications with respect to generation of heat.
4. Since only 1/10 of original energy sources is moved from one level of a food chain to another, calculate the amount of wheat necessary to produce 100 lbs. of human weight if the wheat is first consumed by beef cattle.

D. The student will:
1. List five ways the mechanics of an automobile energy system is wasted in the form of heat.
2. Compare the metabolic generation of heat in a biological system with that of a steam generation in a nuclear power plant.
3. List the many ways heat loss is delt with in our industrial civilization (i.e. heat loss is dissipated from internal combustion engine by means of a liquid radiator or heat vanes or fire on the cylinder heads).
4. Identify five major processes whereby man has inadvertently generated thermal pollution.

E. The student will:
   1. Develop an opinion as to whether or not the local community should propose a new shopping center.
   2. Research government and scientific publications to determine the rate of increase in use of energy of the past, present and probability for the future to the year 2000 A.D.
   3. Identify, using a local example of thermal pollution, the rationale for the establishment of the process initially, the real but unintentional detrimental effects. Offer possible solutions.
   4. Construct a graph to correlate the direct effects of heat on an aquatic system by measuring the O_2 content of water at varying degrees of temperature in an artificial lab condition and in a thermally stratified lake environment.

CONSERVATION OF VITAL RESOURCES
Alternative #1

I. OVERVIEW

This module seeks to determine the place of renewable natural resources in man's environment and the importance of conservation of these resources. Renewable natural resources are interrelated and are an integral part of man's environment. His activities affect these resources either positively or negatively. Attempts will be made to point out some of man's past errors and some of the losses and disasters that have occured as a result of ignorance, greed or thoughtlessness. The need for long range planning in this area will be stressed.

II. CONCEPTS

A. Man's renewable resources are air, forests, grasslands, soil, water and wildlife.
B. Conservation is the wise use of natural resources.
C. Renewable natural resources are interelated and are an integral part of man's environment.
D. Man has made many errors in the past. Some of the losses and disasters that have occured are a result of man's ignorance, greed and thoughtlessness.
E. Intelligent conservation planning requires consideration of various factors and their long-range implications.

III. STUDENT OBJECTIVES

A. The student will define the term renewable natural resources and list the renewable natural resources.

B. The student will:
   1. Compare the concept of preservation with conservation.
   2. List many examples of "wise use" for each of the renewable natural resources (soil, forests, wildlife, grasslands).

C. The student will:
   1. Describe interrelationships between the renewable natural resources.
   2. Cite an example of an aesthetic contribution of each renewable natural resource.
   3. Describe a contribution of renewable natural resources to his physical environment.

D. The student will:
   1. List several organisms that are extinct, or nearly so, due to man.
   2. List the reason or reasons why an organism may become extinct.
   3. Cite an example in which the misuse of renewable natural resources has had calamitous effects.

E. The student will:
   1. List the agencies which are involved in long-range planning for conservation of renewable natural resources.
   2. Cite two examples in which agencies have cooperated in solving a common conservation problem.
   3. Given a case study of a conservation measure, identify social, political, economic and health factors and their long-range implications.

IV. RESOURCE MATERIALS

1. Guest Speakers
2. Texts
3. Films

CONSERVATION OF VITAL RESOURCES
Alternative #2

I. OVERVIEW

Vital resources may be categorized as being either renewable or non-renewable. This represents a continuum rather than a dichotomy. If man is to survive as a species with a life style commensurate with today's standard of living, he must be aware of the resources essential to himself. These resources may be living or non-living; renewable or non-renewable; regenerative or reusable. When making an intelligent decision regarding the conservation of a vital resource, man must be able to recognize the interrelationships of the vital resources in the terms mentioned above. In addition, man must also be aware of the many social, political, economic, and healthful implications involved when he makes a decision of this kind.

II. CONCEPTS

A. All resources on this planet are finite. Conservation of these resources is vital. The resources must be preserved by recycling, reuse and intelligent utilization.

B. There is an interdependent relationship between living and non-living resources.

C. Energy is an open system; energy does not recycle. Therefore, life depends upon a constant input of energy through the photosynthetic process.

D. Political awareness of ecological contamination of vital resources is paramount if the life style is to be preserved or improved.

E. Danger signals (cues) relating to the jeopardy of vital resources must be made public.

F. Individual liberties may have to be restrained for the preservation of all life and mankind.

III. STUDENT OBJECTIVES

A. The student will:
   1. Identify in writing three renewable resources and three non-renewable resources.
   2. List those common materials which are recyclable.

B. The student will:
   1. Write one example of a natural extinction of a species, and one extinction which is unexplained.
   2. Sketch the water cycle, carbon cycle, oxygen cycle and nitrogen cycle.
   3. Describe how fossil fuels were formed.
   4. Write one example of a plant community and one example of an animal community which are ecologically and economically important to man.

C. The student will:
   1. Trace the flow of energy through an eco-system.
   2. Explain why producers are independent of consumers but the reverse is not true.
   3. Examine how man's technology is dependent upon the non-renewable resources of stored energy in fossil fuels.

D. The student will:
   1. Identify his congressional representatives and establish contact to inform him of at least three ecological violations in his local area.
   2. Describe and discuss an economic restraint on appropriate political action.
   3. Cite two instances in his local community where clear evidence indicates that drastic modifications of the current use of vital resources must be modified.

E. The student will:
   1. Demonstrate understanding of the cues that vital resources are in jeopardy by listing four instances of depletion of resources in the state he is residing.
   2. Demonstrate understanding of the cues that vital resources are in jeopardy by listing four instances of pollution of resources in the state he is residing.

F. The student will:
   1. Demonstrate awareness of possible restraints on individual freedom by listing and decribing in 25 words or less the three areas of restraint that he considers most appropriate to the conservation of vital resources in his own state.
   2. Demonstrate an appreciation of the possible curtailment of individual liberty by participating in a panel discussion to describe and identify the need for legal enforcement of restraints designed to conserve vital resources.

IV. RESOURCE MATERIALS

1. Audio tape
2. Video tape
3. 2" quad, 1" hilical
4. Video cassettes
5. 16 mm Film clips
6. 16 mm Film strips
7. Models
8. Photographs
9. Special graphics
10. Charts
11. Drawings
12. Diagrams
13. Real people (expert testimony)
14. Slides (2x2)
15. Over-head projectors
16. Transparancies
17. Chromo key
18. Video electronic special effects

CONSERVATION OF VITAL RESOURCES
Alternative #3

I. OVERVIEW

It is essential that man understand and act upon his knowledge of the interdependence necessary for survival of earth resource system. It is important that man understand that the earth is a closed natural system in regard to matter. Categories such as renewable or non-renewable; living or non-living; regenerative or reusable; cyclic or non-cyclic facilitate identification and understanding of the world's vital resources. An intelligent understanding of man's role in this interdependent system (such as effects of control) is essential for effective management of resources. It is vital to understand the problems encountered economically, politically and sociologically in planning solutions for effective management.

II. CONCEPTS

A. Vital resources can be classified as long term, short term, cyclic and non-cyclic, biotic and abiotic categories.

B. The earth is a closed system. It is a single isolated material system in space in which matter is conserved and energy can be added only from outside the system.

C. The earth's resources systems are interdependent.

D. Man intentionally or unintentionally effects the earth's resource systems and must therefore intelligently plan world resources management.

III. STUDENT OBJECTIVES

A. The student will:
1. Define what constitutes a vital resource.
2. Defend or refute the view that all the resources are vital resources.
3. Explain the difference between longterm cyclic, short term cyclic and reusable resources.
4. Classify, using a prepared list, world resources as:
   a. long term
   b. short term
   c. cyclic
   d. non-cyclic
   e. biotic
   f. abiotic

5. Sketch the major components of the hydrologic cycle.
6. Differentiate between the gasious and sedimentary bio-geochemical cycles.

B. The student will:
1. Trace the path of matter on several of the resource classifications as previously listed. (i.e. iron ore to steel to rust).
2. Demonstrate by a flow diagram that energy in the environment is uni-directional
3. Describe, using an analysis of a local stable eco-system, that the natural trend in nature is toward equilibrium of material. Differentiate between dynamic and static equilibrium.
4. Using an example of a hypothetical stable system, describe the possible consequences upon the stability of the system caused by man's interference.

C. The student will:
1. Identify the function of the various components of a sample eco-system.
2. Illustrate in a simple sketch the cyclical nature of a selected vital natural resource.
3. Forcast in written form the consequences of the inclusion or exclusion of a single component in a simple eco-system.
4. Explain how the value of natural resources fluctuates with supply and demand.
5. List two or three examples of interaction among several eco-systems.

D. The student will:
1. List five examples of how man has had an effect on the earth's resources.
2. Describe three to four resources management problems in a locally defined area.
3. Recommend two possible alternative solutions to a resource management problem in a locally defined area. Be sure to include political, economic, sociological and ecological complications.
4. Participate in community resource management planning or action.
5. Project current resource management trends in his community into the future and describe the effects.
6. Demonstrate how a resource management practice in his community affects the world's systems.

POPULATION DYNAMICS
Alternative #1

I. OVERVIEW

The world's population, which was approximately 3.5 billion in 1969, increases about 2% every year. If it continues at this rate, the world population will double by the year 2000. Our present population increases by 180,000 daily - or more than 65 million a year. Half of the population now living on earth has been born since the end of World War II (1945).

The magnitude of this problem arising from this unprecedented multiplication of the human species has stirred the concern of people everywhere. The expansion in world populations, projected for the remainder of this century, is staggering. The impending disaster, foretold by these statistics, decries the immediate concern of the world's approximate 3.6 billion.

II. CONCEPTS

A. Man must control his own numbers or face the consequences of overpopulation.

B. In order to understand the consequences of over-population; man must examine the history which has led to the crisis.

C. Solutions to the over-population crisis are complicated and demand interdisciplinary evaluation and solution.

D. The cause and effect relationship between man and his environment must be replaced by a dialoque which represents an understanding of his obligation and responsibility to succeeding generations.

III. STUDENT OBJECTIVES

A. The student will:
   1. Determine, using data published by the United Nations through one of its agencies, the amount of space each human being in the world needs to carry out the basic human functions. Report orally on this.
   2. Describe, four consequences of over-population.
   3. Express individual attitude on birth control. Defend this attitude in view of population in advanced countries.
   4. State views on abortion, euthanasia, infanticide and war as methods of population control.

5. Describe five non-renewable natural resources and detail what can be done to prevent them.
6. Verbally sketch a likely day's activities of a person living in the inner city in the year 2000. Compare that to the probable life style of a person in a New York slum area today.
7. Keep a written record for one school day. Recording emotional states, physiological condition and environmental factors. Take special note of the number of people in each situation.

B. The student will:
1. Explain the role of each of these in contributing to the population explosion:
   a. agricultural revolution
   b. industrial revolution
   c. medical revolution
   d. technological revolution
   Include for each at least 3 ways each has contributed.
2. Write a two page essay on the ways in which Malthus said population would be controlled.
3. Analyze each of Malthus' alternatives and either support or negate it with examples for each as to whether they would work for present day society.
4. Analyze the role of the "Judeo-Christian" tradition in contributing to the population.
5. Review the action of religious and political bodies with regard to the population problem over the past ten years.

C. The student will:
1. List any number of ways in which an individual can directly or indirectly influence population growth.
2. Explain how and why an adjustment of economic factors might effect the population growth rate.
3. Explain how our present socio-economic system contributes to both an increase and a decrease in our birth rate.
4. Suggest at least two pieces of legislation that would lead to a decrease in population growth.
5. Discuss the biological, social, psychological, economic, and political consequence that will result if the population continues at its present rate.

D. The student will:
1. Take a census (survey) in a five block area of his own neighborhood to discover how many families have:
   a. considered the idea of a population crisis.
   b. are in favor of the use of some form of birth control method.
   c. have not considered birth control methods for religious reasons.

d. if individual were to use or have used some form of birth control method; indicate which of the following.
    1. vasectomy
    2. IUD
    3. Pill
    4. contraceptive
    5. sterilization
    6. rythum method
    7. abstinence
    8. legalizing suicide

Finally; make an evaluation chart indicating the results of the survey which can be compared with those of other students in the class.

POPULATION DYNAMICS
Alternative #2

I. OVERVIEW

The population problem which arises from the unprecedented multiplication of the human species has stirred the concern of people everywhere. The expansion in world populations, projected for the remainder of this centruy, is staggering. The impending disaster, foretold by these statistics decries the immediate concern of the world's billions.

II. CONCEPTS

A. During the last two centuries the world's population has grown at an unprecedented rate.

B. Population of some countries is growing at a faster rate than others.

C. High population density causes environmental problems.

D. An acceptable quality of life is dependent upon a proper balance between population and support systems.

E. Individual concern and action are mandatory for population control.

III. STUDENT OBJECTIVES

A. The student will:
   1. Construct a graph of world population against years starting about 8000 B.C.
   2. Discuss the two phases of population growth since 1750.
   3. Discuss in small groups, why the less developed areas of the world have surpassed the more highly developed areas in population growth since 1900.
   4. List and discuss at least four reasons for the accelerated growth of world population during the last two centuries.
   5. List and discuss the three kinds of population dynamics in present day society.

B. The student will:
   1. Compare the birth and death rates of four countries in different areas of the world.
   2. Discuss the characteristics of those societies which have a high birth and death rate.
   3. Discuss the characteristics of those societies which have high birth but declining death rates.
   4. Discuss the characteristics of those societies which have a declining birth rate as well as a declining death rate.

5. Discuss in small groups whether a high population density nesessarily indicates over-population.

C. The student will:
   1. List five environmental problems brought about by high population density.
   2. Compare an area of high population density with an area of low population density and list three advantages and three disadvantages of each.
   3. List and explain three main factors which brought about population density.
   4. Discribe how the natural environment has been changed in a selected urban area by high population density.
   5. Discuss in small groups solutions to the environmental problems caused by the high population density.

D. The student will:
   1. Discuss in class concepts of an "acceptable quality of life".
   2. Identify different types of support systems required for a city of 100,000 population.
   3. Write a one page paper discussing the possible effects of population growth exceeding one of its support systems.
   4. Identify the relationships between one of the support systems in his community and the natural environment.
   5. Develop with the class an innovative solution to maintaining an acceptable balance between the population and one of its support systems in his community.
   6. Construct a table showing the relationships between population density and need for certain (to be identified by the instructor) collective support systems.
   7. Voluntarily seek to participate in the development of adequate and efficient support systems as well as the preservation of the natural environment.

E. The student will:
   1. Discuss in small groups the need for and the means of educating citizens about the problems of population control.
   2. List and discuss three factors involved in planning the size of a family.
   3. Compare the average family size in the U.S. 100 years ago with the average family size today and discuss the reasons for the differences.
   4. Identify two local or national organizations which deal with population control and discribe their programs.
   5. Discuss in a small group how the individual himself can help control population.

POPULATION DYNAMICS
Alternative #3

I. OVERVIEW

Population is a dynamic phenomena. This dynamism is brought about by both controlled and uncontrolled fluctuations of interacting populations of living organisms. Human population pressure will require a reassessment of past and current beliefs and methods of population control.

II. CONCEPTS

A. The condition of population is never static.

B. Population fluctuations are the result of both controlled and uncontrolled processes.

C. There is an interdependency between all living organisms.

D. Population pressures necessitate a reassesment of current value systems or past population ideas.

E. Methods of population control are both natural and man devised.

III. STUDENT OBJECTIVES

A. The student will:
   1. Construct a graph showing the change in world population from year 1 A.D. to the year 2000 A.D.
   2. List and discuss each effect of the four influences on population levels. i.e. food, disease, natural disasters, war.

B. The student will:
   1. Give an example of how man has successfully controlled his own population growth on a local basis.
   2. Discuss the influence, if any, that organized religion has upon population fluctuations.
   3. Assess the success of a particular method of man in his attempts to control his numbers in terms of his intended objective.
   4. Cite how man's entry into a natural predator pest relationship affects population fluctuation.

D. The student will:
   1. Define a specific past idea of family size and tell how it has led to the population pressures of today.
   2. Select two examples from a list of extinct species provided by the instructor and cite the effects on its community.
   3. Defend or refute the proposition of zero population growth.

E. The student will:
   1. Identify two possible legislative approachs to population control.
   2. List and give at least one advantage and one disadvantage of each of the following four methods of birth control; contraceptive, abortion, abstinence, homosexuality.
   3. List and give at least one advantage and one disadvantage of each of the following four methods of birth control; euthanasia, abortion, infanticide, war.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
CONCEPT A The conditions of population are never static. OBJECTIVES: 1. The student will construct a graph showing the change in world population from year 1 A.D. to the year 2000 A.D.	1. Data for graph will come from library research by student. 2. Data for graph could come from instructor through lecture, film or other classroom activity. 3. Individually or in small groups, the students will collect population data for small blocks of time. Then students will share population data and factors affecting population during that period of time with the class.	1) The student will graph the change in world population from year 1 A.D. to year 2000 A.D.

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (continued) OBJECTIVE: 2. The student will list and discuss the effect of five influences on population levels.	1. The students will make casual observations of a fruit fly population with a closed food supply for one month. This will be done before the topic is discussed. 2. See Strategy A.1.c. 3. Audio-visual aids.	1) List and discuss the effect of five influences on population levels. 2) The student will orally discuss five effects of influences on population levels. 3) The student will write a term paper discussing the effect of five influences on population levels.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
CONCEPT B Population fluctuations are both controlled and uncontrolled. OBJECTIVE: 1. The student will give an example of how man has historically attempted to control his own population growth on a local basis. 2. Discuss the influence, if any, that organized religion has upon population fluctuations. 3. Assess the success of a particular method of man in his attempts to control his numbers in terms of his intended objective.	1. A panel discussion including a minister, a ZPG member, a sociologist, a mother, and a doctor. The panel will have a list of topics to be discussed. 2. The students will survey population groups within their community from their approved classroom, developed questionnaire to find out community attitudes toward population control. 3. Given some provocative statements concerning population control, the students will discuss in small groups, and present a consensus to the class.	1) The teacher will evaluate students' questionnaire which they have filled out from a community survey. 2) Evaluation of student participation in small group discussion. 3) A written example of historical control of population. 4) The student will answer an essay question upon the influence of organized religion upon population fluctuations. 5) The student will select a method of birth control, collect material on this method, and write a paper assessing its success.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
CONCEPT B Population fluctuations are both controlled and uncontrolled. OBJECTIVE: 4. Show how man's entry into a natural predator-prey relationship affects population fluctuation.	1. Have each student bring a poster to class illustrating: a. a predator-prey relation b. man's entry c. result to predator-prey relationship. 2. Use of audio-visuals. 3. The class will discuss how insecticide use in underdeveloped countries has increased food production, and how this has affected population.	1) Evaluation of a student constructed poster. 2) Allow each student to develop a means of illustrating man's entry into a predator-prey relationship and allow his peers to evaluate his effectiveness. 3) In a written question, discuss man's entry into a predator-prey relationship.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
CONCEPT C: There is an interdependency between all living organisms. OBJECTIVES: 1. The student will sketch the "S" and "J" growth curves and explain the meaning of each region of the curve.	1. Given population data limited space and food, (food supply is constant) the student will graph the population growth curve ("S" curve). 2. Given population data, limited space and food (food supply is not continuous or by-products of individuals make environment unhabitable) the student will graph the population growth curve ("J" curve). 3. Lecture.	1) On a written exam, the student will sketch the "S" and "J" growth curves and explain the meaning of each region of the curve.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
CONCEPT C: There is an interdependency between all living organisms. OBJECTIVES: 2. With data supplied by the instructor, graph the population versus time curve and state some conclusions as to the overall population growth.	1. The instructor will describe a population versus time graph, illustrate with some examples and ask the students to discuss possible results. 2. See C.1.a. and C.1.b.	1) The student will, on a written test, graph the population versus time curve and state some conclusions as to overall population growth. 2) The student will devise an experiment (i.e. fruit flies) and keep a lab journal showing population versus time growth for this closed system.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
3. Give an example and explain the cyclic nature of one population as it interacts with another population (i.e. lynx and hare). 4. Relate "carrying capacity" to food supply. List an example of an area in which food supply has been exceeded.	1. Allow the class to divide into small groups, select interacting populations (man-animal, animal, animal-plant, etc.) and present their findings to the class in a fashion they decide is most effective. 2. See B.4.a. with expansion to all interactions. 3. Divide the class into three groups 1. 1/3 will project future population growth (controlled and uncontrolled). 2. 1/3 will project available food supplies under present land usage. 3. 1/3 will compare population versus food supply and list possible solutions.	1) Evaluation of student interaction within a small group discussion. 2) The evaluation of a student generated illustration (slide, tape, snapshots, diagrams, etc.) of the cyclic nature of one population with another population. 3) A written discussion of the "carrying capacity" of the food supply as related to one species. 4) Written discussion of cyclic nature of one population as it interacts with another population.

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
Concept D. Population pressures necessitate a reassesment of current value systems or past population ideas. Objectives: 1. Define a specific past family size and tell how it has led to the population pressures of today. 2. See next page. 3. Defend or refute the proposition of zero population growth.	1. Have each student project from his own family size, the population of the world increase due to his family in 10 generations. a. Assume each child has some number of children as parents. b. length of one generation is mother's age at birth of middle child. c. Assume all parents die at birth of new generation (actually some parents will live more than one generation and some children will die before off-spring are born). 2. See B(1,2,3) a 3. See C (3,4) c.	1) Have the student on a written test select from a list a past idea of family size and discuss how it has led to the population pressures of today. 2) A written defense or refutation of of the proposition of zero population growth. 3) Evaluation of group within a role-play of the aspects of zero population grow

POPULATION DYNAMICS

CONCEPT	STRATEGY	EVALUATION
CONCEPT D Population pressures necessitate a reassessment of current value systems or past population ideas. 2. Select 2 examples from a list of extinct species provided by the instructor and cite the effects on its community.	1. Use of audio-visual 2. The use of an outside speaker (i.e. ecologist, State Fish and Game Personnel, etc.). 3. Have a portion of the class to research and present a discussion of American extinct and endangered species of wildlife	1) Select two examples from a list of extinct species provided by the instructor and cite the effects on its community.

CONCEPT	STRATEGY	EVALUATION
CONCEPT E Methods of population control are both natural and man devised. OBJECTIVES: 1. Suggest two possible legislative approaches to population control. 2. List and give at least one advantage and disadvantage of each of the following methods of birth control; contraceptive, abortion, abstinence, homosexuality, euthanasia, infanticide, war.	1. See B (1, 2, 3) a. 2. The student will collect information on methods of population control. 3. The students will set up an information center or small group discussion for persons in the community on methods of population control. This could be done through already established commity organizations.	1) On a written test, suggest two possible legislative approaches to population control. 2) List and give, on a written test, at least one advantage and disadvantage of contraceptives, abortion, abstinence, homosexuality, euthanasia, infanticide, and war.

POPULATION DYNAMICS
Alternative #4

I. OVERVIEW

The self-regulating phenomenon of population growth maintains species and effectively utilizes the available resources in the environment.

The alteration of the natural cyclic mechanics of population regulation have been altered by man's expanding technical abilities.

Awareness of the dynamics of population development and maintainance is an essential factor in understanding the environment, the cause of contemporary social, economic, political and ecological problems within the total environment.

"The more you have the more you get"

II. CONCEPTS

A. The regulation of natural population is determined by the capacity of the support system; i.e. any and all processes which tend to check the natural increases.

B. Man has effectively raised the carrying capacity of his environment by technological applications. This activity has had substantial impact on the population of non-human species as well as his own environmental quality.

C. Man has circumvented natural environmental resistance factors and, to a larger extent, now controls his own survival abilities at the genetic level.

D. Human population control is absolutely essential on a world wide basis. There must also be a more equitable distribution of the human population.

III. STUDENT OBJECTIVES

A. The student will:
   1. Describe how a limit of population growth is reached under natural conditions. (i.e. number of barnacles on a piling is limited by available space, sea level and tide level).

2. Research an animal population and report on the change in population size over time and the factors involved in the change. (i.e. the passenger pigeon, the horse).

3. Identify the population control factors using a highly defined closed life support system.
4. Demonstrate an ability to handle the basic mathematic relation to exponential natural reproductive increase by making population projections from appropriate data and graphically display such computations.
5. List all of the components within an eco-system which may effect the dimensions of animal population.
6. List five reasons why a rat population in a specific open dumping area will be self-limiting.

B. The student will:
1. Explain why it is necessary to control the slaughter of wild fur-bearing animals that historically have been used to cloth man.
2. List several examples of man's technological manipulation of his environment in regard to food production, construction practices, transportation, fishing techniques, disease reduction and reduction of birth rates.
3. Demonstrate the population fluctuation of pest insect life when pesticides have been used to control them and when genetic resistance to the chemicals occurs. Also relate human population size between 1940 to 1970 in underdeveloped countries where DDT has been applied.
4. Collect data from the locality which will assess the relation between human population change and the change in population of five selected species including plant and animal, (domestic and wild), occupying the same area over the past fifty years.
5. Identify two species where population has decreased and two whose population has increased due directly to man's increasing population in the area.
6. Investigate the effects of temperature alterations on a tank of "tropical fish" when life support perameters have been established. He shall then examine the change in temperature of water bodies (data provided to students by industrial processes). The student should then be asked to generalize, based on the data as to the effect of environmental alterations on animal population.

C. The student will:
1. Project written evidence that modern medical advances have:

a. been used to extend the line of genetically abnormal humans.
b. has developed techniques which have led to increased genetic control over food crops in both developed and underdeveloped nations.

2. Research and prepare a "position paper" on data assertions and predictions relating to genetic alterations in the human species.
3. List undesirable genetic conditions which should be eliminated from the human gene pool.

D. The student will:
1. List five ways in which the World Health Organization can be effective in helping all nations in regard to population control.
2. Using general climate control conditions, prepare an ideal population map showing present densities and desirable (absolute) densities and define criteria to control these densities.
3. Evaluate five human population projections for the next 5000 years with respect to:
a. basic premise stated or implied therein.
b. personal judgement as to most probable outcome.
c. rank order the premises in terms of their impact.
4. Construct a map which demonstrates the center of population concentration in the U.S. or in a state and evaluate the potential environmental problems in the area of water, air, solid waste management, transportation, housing and educational needs.
5. Assuming an ungovernable population expansion seems certain to degrade the quality of life in the foreseable future, try to estimate which aspects of the quality of life will suffer first and offer evidence of this belief.

IV. RESOURCE MATERIALS

1. Guest lecturers (experts in specific fields)
2. Audio-visual (films, tapes, TV, slides)
3. Student hand-outs (census data, etc.)

POPULATION DYNAMICS
Alternative #5

I. OVERVIEW

The magnitude of the problem arising from an unprecedented multiplication of the human species has stirred the concern of people everywhere. The expansion in world populations, projected for the remainder of this century is staggering. The impending disaster, foretold by these statistics, decries the immediate concern of the world's approximately 3.6 billion population.

II. CONCEPTS

A. The population of the world is increasing exponentially as a result of accelerating birth rates and declining death rates.

B. There are many variables influencing birth rates and death rates.

C. Many of our environmental and sociological problems are a result of over population. If the population continues to expand at its present rate, the environment will not be able to support life on this planet.

D. Population control is necessary and there are several alternative methods to accomplish this.

III. STUDENT OBJECTIVES

A. The student will:
   1. Plot a graph showing the growth of the world's population from the birth of Christ to the year 2050.
   2. Discuss the effects of the agricultural industrial revolutions on the world's population growth.

B. The student will:
   1. Outline the principal sociological variables influencing birth rates.
   2. Construct a population pyramid for your state.

C. The student will:
   1. List several social and environmental problems which would be alleviated by achieving zero population growth.
   2. Evaluate the Malthus Theory as it relates to today's environmental problems.
   3. List several possibilities for increasing the world's food supply in the future.

D. The student will construct a bar graph showing the relative efficiency of four methods of birth control.

IV. RESOURCE MATERIALS

1. Audio tape
2. Video tape
3. Video cassettes
4. Filmstrips
5. Three dimensional models
6. Photographs
7. Special Graphics
8. Charts
9. Drawings
10. Diagrams
11. Real people (expert testimony)
12. Slides
13. Overhead projectors
14. Transparancies
15. Chromo key
16. Video electronic special effects

URBANIZATION: THE LIVING COMMUNITY
Alternative #1

I. OVERVIEW

The population magnet may create over-crowding, a depletion of resources, waste and sewage management problems, air and water pollution, proliferation of disease, and most importantly the diminishing of the human spirit.

II. CONCEPTS

A. The growth of cities has occurrec in response to man's needs.

B. The continuing concentration of people in urgan areas with its concommitant deterioration of living standards necessitates immediate consideration and concern for finding methods of improving these conditions.

C. New philosophies regarding urban development have emerged because of the increasing urban crises.

III. STUDENT OBJECTIVES

A. The student will:
   1. Write the United Nations' definition of the term urban.
   2. Explain what the following have contributed to the growth of our cities.
      a. agricultural revolution
      b. the steam engine and the industrial revolution
      c. farm mechanization
      d. cultural opportunites

B. The student will:
   1. Describe the results of eliminating slums (ghettos) by replacement with mixed income housing developments.
   2. Describe what happens to individuals required to move or relocate.
   3. Differentiate between a master plan and a sector plan.
   4. Name three areas within the U.S. where megalopolis are developing.
   5. Evaluate the interrelationships and shared services and facilities of the urban-surburban community.
   6. Give an example of a regional plan.
   7. State the approximate acres of farmland absorbed annually by cities and highways.

C. The student will:
   1. Research to identify the present trends in urban development.
   2. Using the concepts gained through literary research as well as his personal innovations to develop a plan or design for an urban development.

IV. RESOURCE MATERIALS

1. Audio tape
2. Video tape
3. Video cassettes
4. Film clips
5. Film strips
6. Three diminsional models
7. Photographs
8. Special graphics
9. Charts
10. Drawings
11. Diagrams
12. Real people (expert testimony)
13. Slides
14. Overhead projectors
15. Transparencies
16. Chromo key
17. Video electronic special effects

URBAN ENVIRONMENT
Group Originated

I. OVERVIEW

Historically cities were developed by man in response to his needs. Technological and physiographic features contributed heavily to their location. An urban environment may be viewed as a metabolic entity and this urbanization has affected the life style of human groups therein. For optimum development of a healthy urban environment, urban planning and management is essential.

II. CONCEPTS

A. Historically cities were developed by man in response to his needs. Their location was influenced by physiographic features and technology.

B. Urbanization has affected the life style of human groups.

C. The city may be viewed as a metabolic entity.

D. Urban planning is an on-going process.

III. STUDENT OBJECTIVES

A. The student will:
   1. List at least five physiographic features that may play a part in determining urban location and discuss their role in city location.
   2. Outline the role of trasportation in urban development.
   3. Trace the use of cities in connection with plant domestication.

B. The student will:
   1. Identify at least five current issues that illustrate diffusion of responsibility typical in urban living.
   2. Illustrate a specific example of how urban living creates a sense of anonymity.
   3. Defend the view that urban living places a greater stress on the environment than rural living.
   4. List ways urbanization affects the territorial imperative of man.
   5. List three factors that lead to a feeling of individual security in a city.

6. Illustrate by example how difficult it is for the individual to become involved in the politics of urban life.

C. The student will:
   1. Because the city may be viewed as a metabolic entity, list five input requirements that are needed for the life of the city and also five outputs of the city.
   2. Using the analogy of a city as a metabolic entity, trace an input (i.e. wood) through an urban system (or systems) to its output.
   3. Identify three urban systems that parallel each of three systems of the human body and explain why he chose that system (communication-nervous system).
   4. Write an essay on the effects of the cities' input requirements and consequent outputs on the surrounding rural area and/or the rural areas influence on the city.

D. The student will:
   1. Describe an on-going process of planning.
   2. Select a local problem area and investigate its past and present planning.
   3. Explain what is meant by "design with nature".
   4. Select a plan considered in objective two and compare it to one of your own in terms of the environment.
   5. Evaluate the various approaches to the planning processes (ex. regional or local planning).

URBAN ENVIRONMENT

CONCEPT	STRATEGY	EVALUATION
A. Historically cities were developed by man in response to his needs. Their location was influenced by physiographic features and technology. OBJECTIVES: The student will: 1. List at least 5 physiographic features that may play a part in determining urban location and discuss their role in city location.	1. Case study of a given community; Example: Miami 2. Give general "requirements" for community location, for example, resources, transportation, climate. Given a blank map, indicate probable community locations. 3. Use an attitude survey incorporating concepts. 4. Simulation game specifying roles to students -- Where should a plant be located in a given area -- nationally. Cite specific location alternatives. 5. Lecture introduction to present the problem. 6. Use outside resource person to present the problem.	1) Oral Report 2) Teacher conducted test 3) If case study done, keep log to be checked.

CONCEPT	STRATEGY	EVALUATION
Concept A (Continued) OBJECTIVES: The student will: 2. Outline the role of transportation in the development of cities.	1. Make a traffic count at a major intersection and pay attention to peak hours and kinds of traffic (trucks, private vehicles, etc.) 2. Use film on transportation. 3. Visit a local agency such as Rapid Transit Authority, Chamber of Commerce & determine from them the vote at transportation in city development.	1) Oral presentation 2) Written report

CONCEPT	STRATEGY	EVALUATION
Concept A (Continued) OBJECTIVES: The student will: 3. Trace the growth of the domestication of plants in the development of cities.	1. Research an article on food and agriculture, such as Mangelsdouff's "Wheat" from Scientific American. 2. Make a trip to the grocery store and identify on a map the source of various fresh produce products. 3. Pre-test survey to determine the variety of foods available to the urban dweller.	1) Written report 2) Oral report 3) Teacher constructed sequential test.

URBAN ENVIRONMENT

CONCEPT	STRATEGY	EVALUATION
B. Urbanization has affected the life style of human groups. OBJECTIVES: The student will: 1. Identify 5 current issues that illustrate diffusion of responsibility typical of urban living.	1. Examine a city directory or telephone book the number of government agencies that govern urban affairs with possible overlapping authority. 2. Write a brief case history of a current issue in urban life and focus attention on the varying points of view of parties involved on the issue. 3. Graphically illustrate how a city tax dollar is distributed in terms of service purchased. Also, its origin and ultimate distribution.	1) Teacher constructed test 2) Student constructed test 3) Observation using criteria sheet

CONCEPT	STRATEGY	EVALUATION
Concept B (Continued) OBJECTIVES: The student will: 2. Illustrate on a specific example how urban living creates a sense of anonymity.	1. Write a paragraph about your neighbor telling occupation, name, number of children and other non-private circumstances. 2. List at least three things a person may do when in a strange urban environment that helps him to obtain a sense of belonging. 3. Itemize the various sources of numbers used to represent an individual (tax number, savings account, credit card, etc.)	1) Creative expression (song, poem, etc.) 2) Written report

CONCEPT	STRATEGY	EVALUATION
Concept B (Continued) OBJECTIVE: The student will: 3. Defend or refute the view that urban living places a greater stress on the environment than rural living.	1. Compile statistics to support this view. Make use of government agencies. 2. Compare air sampling of air taken from a busy traffic artery to that of an open pasture or field. 3. Based on 5.4 lbs. per capita for solid waste, calculate the tonnage of daily solid waste for the population of your city.	1) Group report 2) Term paper 3) Journal on log kept on environmental studies

CONCEPT	STRATEGY	EVALUATION
Concept B (Continued) OBJECTIVE: The student will: 4. Support or refute the view that urbanization affects the territorial imperative of man.	1. Readings supplied by the class instructor to set the stage for a debate. 2. Do a term paper. 3. Two outside resource speakers to take opposing sides of the question.	

CONCEPT	STRATEGY	EVALUATION
Concept B (*Continued*) OBJECTIVES: The student will: 5. List three factors that lead to a feeling of individual security in a city.	1. Lecture on group dynamics and discussion 2. Film on "interpersonal relationships." 3. From a city directory determine the number and kind of agencies designated to help urban dwellers obtain a sense of security. 4. Resource speaker. Example: A foreign student in the country; new student in community, to tell how he developed security.	1) Written report 2) Oral report 3) Teacher Test

CONCEPT	STRATEGY	EVALUATION
Concept B (Continued) OBJECTIVES: The student will: 6. Illustrate by example how difficult it is for the individual to become involved in the politics of urban life.	1. Conduct a random sample street interview to obtain the extent to which people are not involved in urban politics and the reasons why. 2. Obtain from the Registrar the number of citizens who are registered to vote and compare this data to the number who are qualified and not registered. 3. Determine by a study of past political events the number and kind of decisions that were made in a given span of time (2 Yrs.) by voter participation.	1) Observation using a criteria for assessment. 2) Written report 3) Oral report

CONCEPT	STRATEGY	EVALUATION
Concept C The city may be viewed as a metabolic entity. OBJECTIVES: The student will: 1. Demonstrate how the city may be viewed as a metabolic entity by listing 5 input requirements that are needed for the life of the city and 5 outputs of the city.	1. Lecture on energy needs of the city. 2. Survey three urban industries and determine what raw materials are needed from outside the city. 3. Given the hypothetical condition, "that all outside transportation is cut off from a city, "determine what functions of the city would experience difficulties first.	1) Journal on log on functions of city. 2) Oral report 3) Written report 4) Specific homework assignments

CONCEPT	STRATEGY	EVALUATION
Concept C (Continued) OBJECTIVE: The student will: 2. Trace an output (i.e., wood) through an urban system or systems of its output, drawing on the analogy of a city as a metabolic entity.	1. Film on use of raw materials. 2. Fantasy Trip: Imagine yourself as a cup of iron ore and trace the events that might occur as you evolve to a final output product. 3. Resource person such as City Planner or City Manager	1) Teacher-made text 2) Diagram or sketch 3) Oral presentation

CONCEPT	STRATEGY	EVALUATION
Concept C (Continued) OBJECTIVE: The student will: 3. Identify 3 urban systems that parallel each of 3 systems of the human body and explain why he chose that system (communications -- nervous system).	1. Study a filmstrip on excretory system of the human body and make the proper analogy. 2. Game playing for analogy. Name body organs and systems to let students draw urban parallels. 3. Construct a chart showing adverse effects on the human body by the introduction of foreign elements and draw urban analogies for similar introductions.	1) Diagram on sketch 2) Oral presentation 3) Written report 4) Observation using criteria for assessment

CONCEPT	STRATEGY	EVALUATION
Concept C (Continued) OBJECTIVE: The student will: 4. Discuss in writing the effects of the cities' input requirements and consequent outputs on the surrounding rural area and/or the rural areas influence on the city.	1. Research on urbanization 2. Lecture and discussion 3. Document statistically from public records the city's dependency upon raw materials (or other input) from non-urban areas. 4. Written report	1) Written report 2) Teacher made test 3) Team paper

URBAN ENVIRONMENT

CONCEPT	STRATEGY	EVALUATION
Concept D Urban planning is an on-going process. OBJECTIVE: The student will: 1. Describe an on-going process of planning.	1. Lecture on urban planning and development 2. Read historical development of cities. 3. Resource speaker (City Planner) 4. Film, "Cities of the Future". 5. Research on Philosophy of Florida's Disneyworld.	1) Oral report 2) Teacher test 3) Student teacher conference 4) Group report

URBAN ENVIRONMENT

CONCEPT	STRATEGY	EVALUATION
Concept D (Continued) OBJECTIVE: The student will: 2. (Given background information) Select a local problem and investigate its past and present planning.	1. Discussion oriented toward sources to obtain background information. 2. Case study on the subject of planning. 3. Resource speakers - City Planner.	

CONCEPT	STRATEGY	EVALUATION
Concept D (Continued) OBJECTIVE: 3. What is meant by "Design with Nature."	1. Take a field trip through your city and document instances where nature has been infringed upon by man's urban design. 2. Construct a hypothetical situation whereby nature is properly respected so as to create a balance between urban design and nature. 3. In class discussion: Draw examples from students from various backgrounds as to how nature has either been respected or abused in urban design. 4. Research at least 4 different geographic regions of the U.S. and determine how geography poses both obstacles and opportunity in urban design.	1) Keep log or journal 2) Oral report 3) Written report 4) Observation using criteria for assessment

CONCEPT	STRATEGY	EVALUATION
Concept D (Continued) OBJECTIVE: The student will: 4. Be able to evaluate the various approaches to the planning processes (Example: Regional or local planning.)	1. Outside speaker - City Planner. 2. Hypothetical situations posed by instructor to criticize. 3. Construct a presentation illustrating a good plan.	

WATER - SUPPLY, DEMAND AND POLLUTION
Alternative #1

I. OVERVIEW

This module deals with water; its supply and utilization. It will be stressed that students develop an understanding of the water cycle and the uses and abuses of water as it affects his own life.

II. CONCEPTS

A. Water is the basis for support of all life.

B. Water is widely but unevenly distributed over the face of the earth. Its availability in useful quantity and quality is a major concern for humanity.

C. Water is a renewable natural resource because it passes through a cycle - the hydrologic cycle.

D. Man's utilization of water has affected the quantity and quality of water resources.

III. STUDENT OBJECTIVES

A. The student will:
   1. Recognize water as an essential component in all levels of biological activity - from the cell to the eco-system, by:
      a. citing the role of water in photosynthesis and respiration
      b. presenting examples of the internal and external water related phenomena.
   2. Demonstrate that water is a vehicle for movement of vital materials necessary to life by citing examples at both the micro and macro levels of biological activity.
   3. Illustrate by example that water also serves:
      a. cultural needs
      b. economic needs
      c. technological needs
   4. Recognize the distinct association of water resources and the evolutionary processes responsible for life on earth by giving five examples of water related adoptations in plant life or animal life.
   5. Demonstrate the unique physical properties of water.

B. The student will:
   1. Identify eight major, distinct uses of water by man.
   2. Describe water qualities satisfactory for each major use specified in (1) above.
   3. Approximate the quantity of water consumed in the following activities:
      a. personal consumption
      b. food production
      c. industrial use
   4. Describe two specific practices for reducing water consumption in each of the activities in (3) above.
   5. Write procedures for reprocessing water to suitable quality for each use in (1) above.
   6. Distinguish saline and potable waters by:
      a. making a map of marine waters and saline lakes of the world.
      b. making a map of principle rivers and fresh water lakes.
   7. Construct a map of rain fall (precipitation) of the world and show shore areas that receive less than ten inches per year.

C. The student will:
   1. Identify the three states of matter in relation to water.
   2. State the relative percentage of the worlds water supply in each of the three states in (1) above.
   3. Explain the effect of the tilt of the earth's axis on the polar ice caps.
   4. Explain the geographic relation of the heat budget with relation to evaporation and rainfall and the climatological consequences of this.
   5. State the sources of rivers, streams underground water aquafiers and the water table.
   6. Explain the effect of evaporation on cloud formation.
   7. Describe the role of some air pollutants as cloud condensation nuclei.
   8. Identify the major steps of the hydrologic cycle, most particularly those processes in which organic and inorganic materials are removed.
   9. Construct a diagram detailing the principle processes and their locations in the hydrologic cycle.

D. The student will:
   1. Locate, physically or geographically local sources of water for human use.
   2. Identify local utilization of water and what happens to this water after its primary utilization.

3. Defend the rights of all forms of life to useable water supplies, i.e. the maintenance of any existing ecological niche.
4. Participate in personal or civic activities to halt further deterioration of our aquatic eco-system and to seek political avenues forward the improvement of these aquatic systems.
5. Debate the question of whether all water should be as "clean" as water for human uses.

IV. RESOURCE MATERIALS

1. Maps (wall, transparencies, student handouts) of area, state (water shed and reservior) and regional
2. Films ("Who Killed Lake Erie - CBS)
3. Film strips("Clear Water")
4. People (Colleges, state and local organizations and industry)

WATER - SUPPLY, DEMAND AND POLLUTION
Alternative #2

I. OVERVIEW

This module deals with water - supply, demand, and pollution. It is designed to develop awareness of the factors causing the problem; methods of defining the problem; the scope of the problem; and the means of alleviating the problem.

II. CONCEPTS

A. Water is a basic resource necessary to sustain life.

B. The natural water supply is limited by factors beyond the control of man.

C. Demand for usable water is increasing due to population and technology.

D. Amount of usable water is decreasing due to pollution.

E. Man must manage his water resources to assure appropriate quality and quantity.

III. STUDENT OBJECTIVES

A. The student will:
   1. Discuss the role of water in the life cycle of organisms ranging from microscopic to human.
   2. Write a paragraph identifying ways in which the development of civilization has depended on the distribution of water.
   3. Explain how water supply relates to food production during a class discussion period.

B. The student will:
   1. Sketch and discuss in a short paragraph the hydrological cycle.
   2. Identify world systems of water movement by tracing their flow movements on a map.
   3. Analyze per capita water needs and relate them to population trends during a class discussion.
   4. Project water needs in the future for local and world wide use by writing a few paragraphs.

D. The student will list five natural ways in which various segments of society pollute water.
   1. Industry
   2. Agriculture
   3. Municipal
   4. Individual

E. The student will:
   1. Determine the quantity and quality of water needed in various human pursuits, through a group discussion.
      a. industrial
      b. personal use
      c. recreational use
      d. agricultural
   2. Discuss current water conservation.
   3. Identify from a list the major factors which shape water policy. (sociological, economic, political)

IV. RESOURCE MATERIALS

1. Use of multi-media
2. Outside speakers
3. Video tape recordings

WATER - SUPPLY, DEMAND AND POLLUTION
Alternative #3

I. OVERVIEW

This module is designed to show that although there appears to be an unlimited supply of water, there is a small amount available for man's direct consumption. There are various sources of water which are being abused and depleted by man at a rapidly increasing rate. Man's survival is dependent upon solving the water problem.

II. CONCEPTS

A. There is virtually an unlimited supply of water although only a very small percentage is available for man's consumption.

B. There are various, sources of water for man's consumption.

C. The demand for water is increasing at a very rapid rate.

D. Man's use and abuse of water affects the supply.

III. STUDENT OBJECTIVES

A. The student will:
   1. Identify, from a list of water sources, what percentage of the world's total water supply in each of the following categories;
      a. world's ocean
      b. sub-surface water on continents
      c. surface water on continents
   2. Estimate the percentage of the world's supply of water circulated annually within the hydrologic cycle.
   3. Describe why only a small portion of continental water is available for man's use.
   4. Compare the amount of groundwater in your community with amount of runoff in streams which are available for use.
   5. Describe how the lowering of water tables affects the availability of water from streams.
   6. Explain why the main water problems in most areas is one of maintaining good water quality.

B. The student will:
   1. Give three natural sources of water for man's consumption.
   2. Define permeable, porous, and aquafer.
   3. Explain how water gets into the ground, how it is stored, and ways man can obtain it for usage.
   4. List and explain two sources of water other than natural.
   5. Diagram the water passage from the atmosphere to a water glass at home.

C. The student will:
   1. List three uses of water (other than domestic).
   2. Compare daily domestic use of water to industrial use in the U.S.
   3. Discuss, in small groups, the Los Angeles Basin, as a classic example of an area with an unbalanced water demand and water supply.
   4. Give three reasons for shortages of usable water.
   5. Project, from a list of reliable sources, the decade in which local demand will exceed supply.
   6. Compare the average daily water supply and consumption of the U.S. with that of the Soviet Union.

D. The student will:
   1. Discuss at least one way to prepare water for reuse by man.
   2. List two ways in which man's use of water results in its pollution.
   3. Give two examples of specific bodies of water that have been seriously polluted and give two examples of those that have been cleaned up.
   4. Give one way in which groundwater becomes polluted and how that problem might be solved.
   5. Trace the passage of water from his home until it becomes part of the natural supply.
   6. Discuss, in a small group, water problems in his community and how they might be solved.

IV. RESOURCE MATERIAL

Films
1. "Groundwater the Head and Reservoir"
2. "Man's Problem"

WATER - SUPPLY, DEMAND AND POLLUTION
Alternative #4

I. OVERVIEW

Because water is an absolute necessity man must recognize that water exists on earth in a fixed amount but only a small fraction is fresh water which at the present time man is able to make available for his own use.

With the increase in standard of living, the per capita demand for water is increasing more rapidly than the increase of population. Man will imperil the quality of life in the future unless he overcomes his capacity to foul and mismanage his limited water supply available to him.

II. CONCEPTS

A. Water is an absolute necessity.

B. Water exists on earth in a fixed amount, but only a small fraction is fresh water available to man.

C. The per capita demand for water is increasing more rapidly than population growth.

D. Man has the capacity to foul and mismanage the limited water supply available to him.

III. STUDENT OBJECTIVES

A. The student will:
   1. List five physical properties of water which demonstrate the uniqueness of its behavior as a material.
   2. Describe the three possible reactions of organisms to water shortage.
   3. List at least five industrial processes which require the most water on a national or local level.
   4. Compare the climate of England with the climate of maritime Canada at the same latitude and explain the variations.
   5. Hypothesize climatic consequences of no large bodies of water on earth.
   6. Give a specific example of how drainage of wetlands has had undesirable ecological consequences.

B. The student will:
   1. Sketch the way the hydraulic cycle operates.
   2. Construct a pictorial graph illustrating the following amounts in percentages:
      a. salt water
      b. fresh water (surface and underground)
      c. ice
      d. water vapor
   3. List three novel ways of increasing the amount of fresh water available to man.
   4. Illustrate in an example how a fixed amount of available water affects social values in terms of distribution.

C. The student will:
   1. List the major steps in pre- and post-treatment of potable water.
   2. List demands made on the water supply in his home today which were not demands twenty-five years ago.
   3. List available devices which would increase water demand in his home.
   4. Choose a local industry and identify all its water uses in its product production (omit drinking water for employees).
   5. Assuming a closed water supply for the production process, outline the steps industry must undertake to make their water reusable.

D. The student will:
   1. Delineate the uses that could be categorized as misuse of his daily water supply.
   2. Identify two or three industrial uses of water in the local community and determine how it has affected the water supply.
   3. Identify the recreational uses of water in local community and specify the effects on various groups.
   4. Given a simulated or actual situation of supply and demand in a community (family, town, city, state, etc.) stipulate how the water supply can be managed for optimal use.
   5. List at least four ecological disadvantages of constructing dams across moving bodies of water and explain each.
   6. List two arguments in favor of constructing dams as applies to conservation.
   7. Describe the factors which led to the current status of Lake Erie. What existing parallels do you see in a body of water near your own locality. State some action plans for intervention needed, if any.

8. Explain in detail the effect that sewage disposal has on water supply quality and describe the various sewerage treatment levees.
9. Account for U.S. agricultural land in terms of how much is dry farm irrigated but could be put in production.
10. Give three long range effects of irrigation of lands.

WATER - SUPPLY, DEMAND AND POLLUTION
Alternative #5

I. OVERVIEW

This module deals with water-supply, demand and pollution. It is designed to bring into awareness the factors causing the problem; methods of defining the problem; the scope of the problem; and the means of alleviating the problem.

II. CONCEPTS

A. There is a biological as well as technological need for water.

B. All the water available to plants and animals is provided through the hydrologic cycle.

C. The chemical and physical properties of water determine its function in nature and affects its supply and demand.

D. Man's indiscriminate use of his water supply has resulted in its pollution.

E. Water shortages arise most commonly because many uses of water render it unfit for subsequent use. This is often compounded by the growth of populations in areas which are by nature limited in the availability of water.

F. Water availability can be increased by elimination of organic and industrial pollutants through proper treatment, recycling and judicious use.

III. STUDENT OBJECTIVES

A. The student will:
   1. Outline the biological uses of water.
   2. Describe three industrial uses of water.

B. The student will:
   1. Trace a drop of water through the hydrologic cycle.
   2. Describe the effects of plants on the hydrologic cycle.
   3. Explain why the amount of water available for use by man is necessarily limited by the hydrologic cycle.

C. The student will:
   1. Explain why the chemical properties of water make it a universal solvent.
   2. Relate why the chemical and physical properties of water make it useful in industry.

D. The student will:
   1. List ways in which he can personally help improve the quality of water.
   2. List some of the unnatural components of water which might make it difficult to purify.
   3. List three local industries that use large volumes of water in their industrial processes.

E. The student will:
   1. List two areas in the U.S. where water shortages are most acute and the reasons for it.
   2. Explain why the following areas are short of water:
      a. Miami
      b. Los Angeles
      c. New York City

F. The student will:
   1. Visit and evaluate the local sewage disposal plant.
   2. Explain why man must adjust his living pattern and life style to the available water supply.

IV. RESOURCE MATERIAL

1. Audio tape
2. Video tape
3. Video cassettes
4. 16 mm film clips
5. 16 mm film strips
6. Models
7. Photographs
8. Special graphics
9. Charts
10. Drawings
11. Real people (expert testimony)
12. Slides (2x2)
13. Overhead projectors
14. Transparencies
15. Chromo key
16. Video electronic effects

AIR POLLUTION
Alternative #1

I. OVERVIEW

In search of improved life styles and more acceptable human environments, man has inadvertantly or without sufficient concern expelled numerous pollutants into the air. This air pollution has now raised grave concern in the areas of (1) physical health (2) mental health (3) aesthetics (4) economic values and (5) other natural life. Because of the natural movement and extent of air movement and extent of air masses and the tremendous increase in the production of air pollutants, the problem is no longer a parochial concern.

The air pollution problem is planetary in scope and consequently a knowledge of air pollution causes is important in the education of every individual. We must understand the reciprocal nature of of man's activity and social values which motivate his activities. The student should be aware of his personal responsibility specifically for air pollution control and generally for all pollution controls.

II. CONCEPTS

A. A knowledge of the nature of the atmosphere is fundamental to understanding the problem of air pollution.

B. A knowledge of the natures and sources of air pollutants is necessary for making decisions about pollution control.

C. Air pollution can have harmful effects on man's health.

D. Air pollution can have strong effects on the operation of social economic and political institutions.

E. A basic knowledge of air pollution control technology is needed in order to make sound decisions for solving air pollution problems.

III. STUDENT OBJECTIVES

A. The student will:
   1. Predict the path of pollutants, given a weather map indicating origins of air pollutants and atmospheric conditions.
   2. Given a pollution phenomenon, identify contributing atmospheric conditions.
   3. Given illustrations of atmospheric phenomena, identify them by name.

4. Describe two influences of the sun, land formation, and water on movement of air masses.
5. Designate the percentage of gases normally found in the atmosphere, given a list of the gases and a list of proper percentages.

B. The student will:
1. Identify five air pollutants, specifying their common name, chemical name, source, and effects on man and his environment.
2. Given major sources of air pollution (transportation, industry, power plants, space heating, and refuse disposal) compare the amounts of different pollutants produced by each major source.
3. Identify five local sources of air pollution and describe each in terms of the pollutants' characteristics and potential hazards.

C. The student will:
1. Describe two historical examples of serious physical harm to members of an entire community from air pollution.
2. Describe how four physical health conditions can be aggrevated by severe air pollution.
3. List at least three effects of air pollution on man's respiratory system.
4. Rank a list of air pollutants in order of potential danger to good health.

D. The student will:
1. Given a possible air pollution crisis, propose three political or legal steps to deal with the crisis.
2. List three ways pollution control laws will increase costs to:
   a. the individual
   b. government
   c. industry
3. Devise a plan for communicating the actual and potential dangers of air pollution to his community.
4. In a simulated air pollution hearing, act out assigned roles representing civic, government, and business representatives.

E. The student will:
   1. Survey the literature and describe briefly five mechanisms used for air pollution control.
   2. Given a list of air pollutants, identify which technological controls would be effective for each.

IV. RESOURCE MATERIALS

1. Air Pollution Primer, National Tuberculosis and Respiratory Disease Association, New York, N.Y. 1969.
2. A Citizen's Guide to Clean Air, The Conservation Foundation, 1717 Massachusetts Avenue, N.W., Washington, D. C., 20036, 1972 (Free).
3. Air Pollution Manual, American Industrial Hygiene Association, Detroit, Michigan, 48227, 1968 $15).

AIR POLLUTION

CONCEPT	STRATEGY	EVALUATION
A. A knowledge of the nature of the atmosphere is fundamental to understanding the problem of air pollution. OBJECTIVE: 1. Given a weather map indicating origins of air pollutants and atmospheric conditions, the student will predict the path of the pollutants. 2. Given a pollution phenomenon, the student will identify contributing atmospheric conditions. 3. Given illustrations of atmospheric phenomena, the student will identify them by name. 4. The student will describe two influences of the sun, land formation, and water. 5. The student will designate the percentage of gases normally found in the atmosphere, given a list of the gases & a list of proper percentages.	1. Pre-test for basic knowledge. 2. Introductory lecture. a. Resource person (Air Pollution Control expert or local weather man) b. Film 3. Student watch weather program on T.V. 4. Class exercise using a weather map (with overlays) to trace the path of pollutants. 5. Teacher handout.	1. Objective Quiz 2. Student self-evaluation with instructor guidance.

AIR POLLUTION

CONCEPT	STRATEGY	EVALUATION
B. A knowledge of the natures & sources of air pollutants is necessary for making decisions about pollution control. OBJECTIVES: 1. The student will identify five air pollutants, specifying their common name, chemical name, source, and effects on man and his environment. 2. Given major sources of air pollution (transportation, industry, power plants, space heating and refuse disposal) the student will compare the amounts of different pollutants produced by each major source. 3. The student will identify five local sources of air pollution and describe each in terms of the pollutants characteristics and potential hazards.	1. Pre-Test 2. Audio tutorial	1. Problem Solving Quiz

AIR POLLUTION

CONCEPT	STRATEGY	EVALUATION
C. Air pollution can have harmful effects on man's health. OBJECTIVES: 1. The student will describe two historical examples of serious physical harm to members of an entire community from air pollution. 2. The student will describe how four physical health conditions can be aggravated by severe air pollution. 3. The student will list at least three effects of air pollution on man's respiratory system. 4. Given a list of air pollutants, the student will rank these in order of potential danger to good health.	1. Class discussion 2. Library Resources 3. Teacher Handouts 4. Lab demonstration (a) physiograph with cigarette smoker. (b) artificial respiration (on dummy)	Research Paper

AIR POLLUTION

CONCEPT	STRATEGY	EVALUATION
D. Air pollution can have strong effects on the operation of social, economic and political institutions. OBJECTIVE: 1. Given a possible air pollution crisis, the student will delineate (considering economic and social costs to all parties concerned) three political, administrative or legal steps to deal with the crisis. 2. The student will devise a plan for communicating the actual and potential dangers of air pollution to his community.	1. Teacher prepared handouts. 2. Library materials. 3. Attendance at Air Pollution Control Commission Meeting in area. 4. Game Simulation -- Commission meeting with roles assigned as follows: a. Politician b. Industrialist c. Environmentalist d. Citizen e. Media Representative	1. Objective Quiz on 3 political, administrative or legal steps 2. Problem solving 3. Analysis of the game simulation by the student.

AIR POLLUTION

CONCEPT	STRATEGY	EVALUATION
1. Given a possible air pollution crisis, the student will delineate (considering economic costs to all parties concerned) 3 political and 3 legal steps to deal with the crisis.	1. Teacher Prepared Handouts. 2. Library materials. 3. Attendance at Air Pollution Control Commission Meeting in area. 4. Game Simulation -- Commission Meeting with roles assigned as follows: a. Politician b. Industrialist c. Environmentalist d. Citizens	1. (Quiz?) on 3 Political and 3 Legal steps 2. Problem Solving. 3. Analysis of the game simulation by student.

AIR POLLUTION

CONCEPT	STRATEGY	EVALUATION
E. A basic knowledge of air pollution control technology is needed in order to make sound decisions for solving air pollution problems. OBJECTIVES: 1. The student will survey the literature and describe briefly five mechnisms used for air pollution control. 2. Given a list of air pollutants, the student will identify which technological controls would be effective for each and indicate the degree of effectiveness.	1. Demonstration of monitoring control, using models, field trips. 2. Use of library 3. Resource person	Problem Solving.

AIR POLLUTION
Alternative #2

I. OVERVIEW

This module deals with the nature of the atmosphere as essential to understanding air pollution. There are a number of air poltants having a variety of sources. These pollutants have complex interactions with each other and the environment, and meteorological conditions affect their accumulation and dispersal.

There are a multidude of ways in which air pollution affects inhabitants on earth; therefore, individual concern and action are mandatory for effective air pollution control.

II. CONCEPTS

A. Understanding the nature of the atmosphere is essential.

B. There are a number of air pollutants with a variety of sources.

C. Meteorological conditions, as well as the nature of the source, affects the accumulation and dispersal of pollutants; and vice versa.

D. There are a multitude of ways in which air pollution affects the inhabitants on earth.

E. Air pollution control necessitates individual action.

III. STUDENT OBJECTIVES

A. The student will:
   1. Write, or select from a list, three major components of the atmosphere.
   2. Select from a list, or write, the four major gases in the atmosphere and their percentages.
   3. Explain how three components of the atmosphere are important to biological processes.
   4. Define and explain the greenhouse effects.
   5. List and explain four processes of heat transfer.
   6. Explain the importance of particulate matter in the atmosphere.

B. The student will:
   1. List four major processes which produce air pollution.
   2. Identify the major pollutants introduced into the atmosphere by each of these processes.
   3. Name five sources of atmospheric pollutants.
   4. Seek the most important source of atmospheric pollutants in his community.

C. The student will:
   1. Describe the major factors that contribute to the development of a thermal inversion.
   2. Explain the differences between a cyclonic and an anticyclonic condition on the accumulation or dispersal of pollutants.
   3. Explain the importance of topographic features as they relate to the accumulation or dispersal of pollutants.
   4. Diagram and explain the source, the effect, and the suggested removal by meteorological conditions of at least three pollutants which are known to be harmful to man.
   5. Explain why the so-called "heat island of a city" affects the accumulation or dispersal of atmospheric pollutants.
   6. Explain the function of CO_2 in modification of global climatic patterns.

D. The student will:
   1. Explain four ways that air pollution affects the organs of the human body.
   2. Explain how air pollution can add agents to the foods which we eat which are harmful to the body.
   3. Discuss, in a small group, the psychological effects of air pollution.
   4. Give two cases where air pollution has been very detrimental to planning growth.
   5. Explain how air pollution can bring another ice age.
   6. From an appropriate list select the approximate total medical cost in the U.S. per year directly related to air pollution.

E. The student will:
   1. Voluntarily use public transportation, seek to join a car pool, or use alternate modes of transportation.
   2. List three ways he can express his concern to the community about air pollution.
   3. Voluntarily reduce air pollution in his immediate environment.
   4. Prepare a list of local organizations involved in air pollution control and indicate whether they are private or public.

5. Outline procedures for legally acceptable courses a private citizen may take to reduce air pollution.
6. Discuss the role of individual action as a prerequisite to private and public collective action.

IV. RESOURCE MATERIALS

1. Environment and Man, Wagner (Pub. Norton).
2. Man's Impact on Environment, Detwyler, McGraw Hill.
3. Every Man's Guide to Ecological Living, Santa Barbara Underseas Foundation.
4. Population Resources and Environment, Ehrlich.
5. Man and His Physical Environment, McKenzie, Ulgard (Pub.) Burgess.
6. "Heat, It's Nature and Transfer" (movie).

AIR POLLUTION
Alternative #3

I. OVERVIEW

The acute effects of urban air pollution are well documented by extensive studies of air pollution disasters. The intermittant and sub-threshold effects await further evidence, however air pollution control should be immediatly pressed and not await full illucidation of pollutant effects and mechanisms of action.

Community pollution control eminates from individual concern and group action. The student should be made aware of the necessity for his participation in the implementation of air pollution control.

II. CONCEPTS

A. Air pollution issues from many sources.

B. The earth with its atmosphere is a closed material system in which large quantities of pollutants are trapped.

C. Air pollution has widespread effects on the total biosphere.

D. Human energy, like any resource is limited in quantity and quality.

III. STUDENT OBJECTIVES

A. The student will:
   1. List seven sources of air pollution and the contaminants present there in that humans are directly responsible for.
   2. List at least five personal values and judge whether or not his actions resulting from these values have any effect on air pollution.

B. The student will:
   1. Describe the composition of the earth's atmosphere. The description will include the manner in which pollutants are carried and dilluted by the atmospheric conditions.
   2. Identify at least five different pollutants common in the atmosphere with an indication of acceptable concentrations.

3. Discribe the effects of an atmospheric inversion.

C. The student will:
   1. Construct a cost benefit chart concerning a process or product of his choice that leads to air pollution. He will list one cost and one benefit from the following areas:
      a. biological
      b. economic
      c. social
   2. State in a written paragraph whether in his opinion the benefits of this process or product outweigh the costs. He will state at least three reasons for his conclusions.
   3. Write an essay on the effects of ozone on the forest eco-system given the fact that ozone in concentrations higher than .05 parts per million destroys chlorophyll in forest plants. He will include:
      a. food production.
      b. primary, secondary, tertiary consumers.
      c. O_2 production.
      d. effects on temperature, light and humidity in the forests.
      e. effects on man's activities e.g. recreation, lumbering, etc.

D. The student will:
   1. List ten dysfunctional "personal" environmental contributions to air pollution.
   2. Identify ten persons in your national or local community who can successfully be responsible for effective air pollution control status.
   3. Trace a bill through the legislature and demonstrate why any law is difficult to be enacted.
   4. Choose a product now in the market and list five by-products of it's manufacture which are potential or real pollutants.
   5. Describe at least three different types of action that an individual can take to reduce air pollution in his environment.
   6. Analyze each of the types of action he indentified in terms of:
      a. feasibility.
      b. practicality/cost.
      c. contribution to solution.

FOOD AND DRUG POLLUTION
Alternative #1

I. OVERVIEW

Certain chemical additions are generally prerequisite to obtaining efficient food production and proper preservation. However, other chemical additions are strictly consumer-oriented. Their inclusion in our foods is questionable at best, and may indeed constitute a real health hazard. Remedial measures will involve not only identification and regulation of the toxic agents, but certainly will require change of consumer attitudes with regard to the marketing and merchandising of foods.

II. CONCEPTS

A. The production of an ample supply of clean, safe food is a necessity for human well being.

B. The application of chemicals has signigicantly increased world food production.

C. Unwise use of chemicals in food production, preservation and marketing presents an environmental and health hazard.

D. The continued production of ample quantity and quality of food requires intensified and redirected research.

E. Continued consumer education is necessary for intelligent buying habits and nutritional well being.

III. STUDENT OBJECTIVES

A. The student will:
   1. Discuss during class the world food problems.
   2. List the necessary daily nutritional requirements of man with 80% accuracy.
   3. Discuss the effects of efficient agriculture production on other aspects of society.

B. The student will:
   1. Compare, using charts, the crop yields between developed and undeveloped countries.
   2. Cite specific instances in which chemicals have increased food production and quality.

C. The student will:
   1. Given a chart of pesticide chemical toxicity, rank the substances in order of human and environmental health hazards with 100% accuracy.
   2. List the five most persistent chemicals and pesticides used in food production.
   3. List three examples each of environmental and health hazards caused by the unwise use of chemicals in food production.
   4. List three examples each of environmental and health hazards caused by the unwise use of chemicals in food preservation and marketing.

D. The student will:
   1. Given ten years data, prepare a chart comparing food production/acre for five food products.
   2. List three examples of recent research projects which seeks alternatives to chemical control of pests in food production.
   3. List five current research projects which have led to increased quantity and quality of food.

E. The student will:
   1. Visit a local supermarket and list five food additives.
   2. Interview a consumer and list the individual's five main reasons for his choice of food products.
   3. Record daily food choices and determine from a given chart the nutritional value of his diet.

IV. RESOURCE MATERIAL

1. Agriculture Extension Stations and Agents
2. John Deere Equipment Magazines
3. Manufacturing Chemists Association
4. Films

FOOD AND DRUG POLLUTION
Alternative #2

I. OVERVIEW

Certain chemical additions are generally considered prerequisite to obtaining efficient agricultural yields and insuring proper preservation of our food. However, other chemical additions are strictly consumer oriented and their inclusion in our foods is questionable at best, and may indeed constitute a real health hazard. Remedial measures will involve not only experimental identification of the toxic agents, but strict control over the marketing and merchandising of our foods.

II. CONCEPTS

A. Widespread use of chemicals in agriculture leaves potentially harmful residues in food chains of both man and other biota.

B. During processing of foods, chemicals which are added for preservation, flavor enhancement and improvement of appearance often contain substances that are potentially injurious to health.

C. It is imparative to increase knowledge of the effects on the consumer of chemical additives used in the processing of foods.

D. Consumer action from a personal standpoint and through governmental agencies is necessary for protection against pollution of food.

III. STUDENT OBJECTIVES

A. The student will:
   1. Identify the various types of fertilizers, pesticides, antibiotics and hormones used in the production of foods.
   2. Explain the detrimental effects of the various pollutants through the natural food chains.

B. The student will:
   1. Identify the major categories of chemicals added to foods and the reasons for their use.
   2. Relate the chemical additives to their possible effects on man's homeostatic mechnaism.

C. The student will:
   1. Identify different classes of food additives in various foods.
   2. Recognize the extent of the use of given additives.
   3. Compose the benefits of using chemicals in the production and processing of foods to the disadvantages of their use.
   4. List _x_ food additives which are suspected of being carcinogenic.

D. The student will:
   1. Outline the operation of the FDA and local Consumer Protection Agencies.
   2. Advocate the abolition of harmful additives from foods.

IV. RESOURCE MATERIAL

1. Audio tape
2. Special Graphics
3. Video tape
4. Photographs
5. Models
6. Video cassettes
7. 16 mm film strips
8. 16 mm film clips
9. Charts
10. Slides
11. Drawings
12. Overhead projectors
13. Real people (expert testimony)
14. Transparencies
15. Chromo key
16. Video electronic special effects

FOOD & DRUG POLLUTION

CONCEPT	STRATEGY	EVALUATION
CONCEPT A Widespread use of chemicals in agriculture leaves potentially harmful residues in food chains of both man and other biota. OBJECTIVES 1. Identify the various types of fertilizers, pesticides, antibiotics and hormones used in the production of foods.	1. Invite an aquatic biologist to lecture on the eutrophication effects of nitrites, nitrates, phosphates, and metallic ions often found in fertilizers. 2. Use the seminar technique to have a medical doctor: a. explain the possibility of infant methemoglobinemia resulting from nitrite or nitrate contamination of food or water. b. explain the physiological results of contamination of foods or water with metallic ions. 3. Debate the hard vs. soft pesticides issue and list the common ones in present use under each category. 4. Research the extent of the present use of antibiotics in producing meat. 5. Research the history or present use of stibestrol (or diethylstibestrol) in: a) chickens b) pigs c) cattle	1) Quiz on content from: a. Lectures b. Speakers c. Debate Grading of research papers and reports

FOOD & DRUG POLLUTION

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (Continued)	6. Report on present legislative controls concerning use of hormones in meat production.	
2. Explain the detrimental effects of various pollutants through the natural food chains.	Lecture on what is meant by biological magnification through a food chain. Research how DDT and the heavy metals can serve as case studies of biological magnification through predatory birds and fish.	1) Quiz 2) Research Paper

CONCEPT	STRATEGY	EVALUATION
CONCEPT B 1. Identify the major categories of chemicals added to foods and reasons for adding.	1. Display foods which have chemicals added and foods which have no additives. 2. As homework, have students look up: a. common names b. chemical names c. reason for addition 3. Have students bring in foods which have additives and test foods for their shelf life. 4. Compare foods which have different additives to determine which additives are more effective. 5. A speaker from the FDA (or other agency) to give a talk on legal aspects of food additives. 6. Write letters to Congressman on current legislation pertaining to food additives. 7. Discussion by group (class) on attitudes of the American public on additives. 8. As homework, have students look up the GRAS lists (generally upgraded as safe). Discuss list, GRAS (Ask students their experiences with chemicals on list).	1) List types of chemicals and their effects. 2) Match names and formulae with uses or effects of chemicals. 3) Deletion

CONCEPT	STRATEGY	EVALUATION
CONCEPT B (Continued) 2. Relate the chemical additives to their possible effects on men's homeostatic mechanisms.	1. Lecture to students on additives and their effects on humans. 2. Study case histories of effects of chemicals on humans. 3. As homework, review newspaper (and magazine) for examples of chemical effects. 4. Film on chemicals and their effects on environment and human, e.g., film on defoliation.	1. Have student make a film on affects of chemicals on man and his environment. 2. Make a collage showing chemicals and their effects on man and his environment.
CONCEPT C It is imparative to increase knowledge of the effects on the consumer of chemical additives used in the processing of foods. OBJECTIVE 1. The student will identify classes of food additives in various foods. (This objective is rewritten)	1. Visit a food store and identify additives on labels. 2. Look in his kitchen & identify additives on labels. 3. Visit a packing plant. 4. Visit a canning plant. 5. Speaker from food processing industry. 6. Speaker from public health agency. 7. Debate on pros and cons of using food additives. 8. Establish a collection of food labels from foods used in his home.	Match additives to foods they are used in. Turn in a collection of labels. Critique in writing films, speakers, etc.

CONCEPT	STRATEGY	EVALUATION
CONCEPT C (Continued)	9. Interview a chemistry and home economics teacher and compare their opinions about food additives. 10. Find out the acceptable quantity of insect parts in foods. 11. Make a chart showing classes of food additives.	List different foods a given additive is used in. Critique in writing films, speakers, etc. Make graph plotting additives against foods Examination on content.
2. The student will recognize the extent of the use of given additives. (This objective is rewritten)	1. Visit a food store and list additives from labels. 2. Look in his kitchen and list additives from labels. 3. Visit a food processing plant & study controls over amount of food additives used. 4. Speakers from F.D.A. 5. Obtain a DROS list. 6. Calculate amount of given additives in an average daily diet 7. Research how much of a given addi- 8. Make a graph showing the extent of use of the given food additives.	

CONCEPT	STRATEGY	EVALUATION
CONCEPT C (Continued) 3. The student will compare the benefits of using chemicals in the productions and processing of foods to the disadvantages of their use.	1. Speaker (from field of agriculture); subject, using chemicals to increase agricultural yields. 2. Question & Answer session. 3. Speaker (from Health Dept.) to discuss chemicals used in processing of foods (beneficial & harmful). 4. Question & Answer session. 1. Library Research: to find food additives suspected of being carcinogenic; report to class. 2. Question & Answer session	1. Students will (at a later class period) criticize speakers presentation of their subjects. 2. Quiz (Content: subject matter; chemicals used in agriculture & food processing; beneficial, potentially harmful, suspected of being carcenogenic) 1. Students will (at a later class period) criticize speakers presentation of their subjects. 2. Quiz (Content: subject matter; chemicals used in agriculture & food processing; beneficial, potentially harmful, suspected of being carcenogenic).

FOOD & DRUG POLLUTION

CONCEPT	STRATEGY	EVALUATION
CONCEPT D Consumer action from a personal standpoint and through governmental agencies is necessary for protection against pollution of food. OBJECTIVE 1. Outline the operations of the FDA and local consumer protection agencies.	1. Prepare and distribute learning objectives assignment. 2. Homework - Text book readings. 3. Large group discussion of Test and Learning Objectives. 4. Lecture: History of FDA. 5. Demonstration: Overhead projects, organization of FDA; Legal duties of FDA; organization & personnel of Local Consumer Protection Agency. 6. Seminar: 1) Rep. of FDA 2) Pres. Food Processing plant. 3) Public Health Official. 4. Head of Local CPA 7. Student Research recent articles in periodicals on FDA. 8. Film: "Your FDA in Action" 9. Role playing. Characters: 1) President of Food Processing Plant. 2) FDA official 3) Framer 4) Public Health official 5) Head of local CPA These people are snowed in at a a Ski	Short test based on Learning Objectives for assignment. Teacher evaluation of research papers.

CONCEPT	STRATEGY	EVALUATION
CONCEPT D (Continued)	10. Letter to your Congressman giving your views as to how FDA is performing its legal responsibilities.	Evaluation of contents and validity of letter.
2. The student will advocate the abolition of harmful additives to foods. NOTE: Reading of Objective is revised.	1. Library (literature) research on food additives and their functions (uses). 2. Group discussion -- debate, pro and con - on food additives. 3. Lecture on harmful effects of various additives to food substances. 4. Each student writes a letter to FDA regulatory agencies pointing out harmful effects of various food additives, and requesting regulation of their use in food.	1. Each student submits his letter to a panel of students selected by student, who will criticize letter on content and factual information. A grade will be assigned by the Committee 2. The student may submit an appeal to the instructor.

SOUND POLLUTION
Alternative #1

I. OVERVIEW

Noise is an ever increasing problem. The generation of sound has existed throughout history. With the existence of sound has come noise. Noise or unwanted sound, has created definite mental and physical problems for the entire biological community. In addition, the problem has been brought into sharp focus through discussions of the economic and social implications. We shall examine the origin and regulation of noise.

II. CONCEPTS

A. Sound is defined as the transmission of longitudinal compressional waves. There is a need to understand the medium of transmission, energy and scales of measurement.

B. Understanding of physiological aspects of sound and the relation of different biological species to the sound spectrum must be acquired.

C. Man must explain the relationship of the general level of sound to technological growth.

D. The "environment" has an influence on the perception of noise.

E. There is a need for noise control

F. Man must develop a relationship of action concerning his abilities and limitations of noise control.

III. STUDENT OBJECTIVES

A. The student will:
   1. Analyze sound wave patterns in terms of the physical aspects of sound energy.
   2. Obtain a list of decibel levels associated with various noise sources.
   3. Demonstrate his ability to calculate and compute quantitative aspects of sound.
   4. Cite examples of noise levels at decibel intervals of 10 db from 10 db to 100 db.

5. Define sound.
6. Define the meaning of the following terms:
   a. sound waves
   b. decibel levels
   c. frequency
   d. quality
7. Utilize the recognized terminology related to sound and apply these terms to graphic representations of sound patterns.
8. Acknowledge the survival value of sound by citing specific examples of sound stimulated behavioral activities in both human and non-human life.
9. Express graphically the idea of frequency.
10. Define a decibel.

B. The student will:
   1. Illustrate that sound frequencies are differential in their effects on various animal species by making a chart which demonstrates a frequency scale and which species are associated with the parts of the body.
   2. Diagram human ear and label its parts.
   3. Describe the hearing abilities of two separate species of animals (humans may be one) and evaluate the results.
   4. Develop a frequency scale of the range of frequencies audible to man, dogs, birds, and dolphins.
   5. Indicate the typical loss in aural ability (reducing frequency range) in humans age 1 to 30 to 60 years of age.
   6. Given lists of organisms and hearing ranges, match organisms with the appropriate hearing range.
   7. Label a drawing of the sound perception mechanism of various animals and indicate the physiological aspects of sound interpretation.

C. The student will:
   1. Prepare a graph demonstrating technological growth and increase of noise levels. (Plot GNP vs Time - 1850-1970 and superimpose on average decibel level of a major metropolitan area vs. time).
   2. Present graphic data concerning a National Sound Level (NSL) and Technological Growth the student will interpret the graph.
   3. Measure sound levels in different parts of the community:
      a. a park
      b. a school
      c. an industrial park
      d. an office
      e. an entertainment center

4. Name the classes of industries in his community that would damage the hearing of the workers.
5. Illustrate that industrial and general public use of noise generating devices is increasing for both commercial and recreational activities by listing sources in their home and community.

D. The student will:
1. List at least ten sources of noise in his neighborhood and state how he responds to each.
2. a. Participate in two "environmental walks" one is an environment similar to that in which their home is located and another in a relatively different but common residential environment. They shall then be asked to evaluate both as to noise percieved.
   b. By group comparison of results evaluate differential perception levels within and beyond their own environments.
3. Given an audio tape of various urban and rural sounds each at three defined levels of amplitude, (realize the relationship) by covering his eyes and orally rating each sound as pleasant or unpleasant.

E. The student will:
1. Given a list of needs for the control of noise pollution, rank order the needs based on a voluntary survey of neighbors.
2. Secure from appropriate sources in teaching material, a tabulation of decibels x time vs. physiological effect (hearing loss) in humans.
3. Cite data from studies on sound intensity and duration as it affects experimental animals and evaluate this data as it may relate to man.
4. Relate personal attitudes toward noise level preferences with respect to music, motors, and other physiological problems related to noise.
5. Identify physiological problems related to noise.
6. Describe a method of reducing the noise level at:
   a. an airport
   b. a foundry
   c. a rock concert

F. The student will:
1. Name two types of personal protective devices that would control noise individually.
2. Present two examples of how insulation can be used to control noise in an auditorium.

3. Develop a design for industrial noise abatement within the community and defend this plan when challenged on it's economic merits.
4. Participate in political or civic activities to bring about noise pollution abatement.
5. Review local regulations concerning noise abatement.
6. Use an original sound level scale to determine sound levels in various areas of his environment.
7. Given a specific noise problem (airport, TV, radio, cars and trucks), devise a noise control mechanism for the affected environment.
8. List various health and/or psychological problems of man directly attributable to a specific noise source. (example - the car).

SOUND POLLUTION
Alternative #2

I. OVERVIEW

Man must become aware of the possible physiological and psychological damage which can occur as a result of noise pollution. An investigation of the sources of noise should be attempted in order that appropriate courses of action can be formulated. A complete understanding of the problem will require a knowledge of the physical nature of sound and the anatomy and physiology of the human ear.

II. CONCEPTS

A. Man must understand the problem of sound pollution. A knowledge of the physics of sound and anatomy and physiology of the ear is necessary to accomplish this.

B. There are beneficial as well as harmful effects of sound.

C. Sources of Sound Pollution are varied and are increasing at a rapid rate.

D. Solutions to most sound pollution are presently available and merely need to be implemented.

III. STUDENT OBJECTIVES

A. The student will:
   1. List the three components which are necessary for sound to occur and demonstrate that the absence of one of these components results in a lack of sound.
   2. Trace the pathway that sound takes during its passage through the ear to the brain.
   3. Distinguish between the intensity and pitch of sound and tell how each one is measured.

B. The student will:
   1. List the sounds considered both psychologically and physiologically beneficial and defend these choices.
   2. Explain the effects of loud noise or sounds of high decibels on the physiology of the ear.
   3. Demonstrate an ability to use sound monitoring devices.
   4. Research the decibel level which cannot be exceeded on a sustained basis without permanent ear damage.

C. The student will:
   1. Using sound monitoring devices survey his community and identify five major sources of noise pollution.
   2. Identify five sources of sound pollution which were non-existant 10, 25 and 50 years ago.

D. The student will:
   1. Investigate the extent to which local city council has taken steps toward abating sound pollution.
   2. List any number of techniques that are now in use to reduce sound intensity.
   3. Visit a local industry and describe the safety provisions against sound pollution.

IV. RESOURCE MATERIALS

1. Audio tapes
2. video tape
3. Video cassettes
4. 16 mm film clips
5. 16 mm film strips
6. Models
7. Photographs
8. Special graphics
9. Charts
10. Drawings
11. Diagrams
12. Real people (expert testimony)
13. Slides (2x2)
14. Overhead projectors
15. Transparencies
16. Chromo key
17. Video electronic special effects.

SCENIC POLLUTION
Alternative #1

I. OVERVIEW

Starting with the immediate environment of his school, home, and community, the student will examine the evidences of scenic pollution and develop an awareness of what scenic pollution is, the reasons causing it, its harmful effects, and how it may be minimized or eliminated.

Emphasis will be placed on the distinctions between scenic modification and pollution as it affects man.

The role of industries in scenic degradation and inefficient use of resources will be examined and the social, psychological, economic and political implications of scenic pollution investigated.

Efforts will be made to develop alternative techniques of industrial advertising and disposal of liquid and solid wastes. These efforts will include discussion of how to change our societal patterns of throwaway packaging, and "frontier mentality" of "leave the mess behind and move on".

II. CONCEPTS

A. Man has ignored the visual effects from an aesthetic viewpoint of his advertising action.

B. Larger size, repetition and the concept of the new and improved have had a detrimental effect on the conscious and unconscious feelings for the visual environment.

C. Repetition and large size in advertising and architecture have encouraged insensitivity to quality judgements in the natural environment and have not encouraged man to feel value for the products of his own hand.

D. Products which are simulations of natural materials might foster a sense of unreality and callous indifference toward the natural visual environment.

III. STUDENT OBJECTIVES

A. The student will:
   1. Record (with a camera) the number of occurrences of the

same advertising image that you see on your commuter route. make a list of the intervals (distance between the occurrences).

2. List products seen daily which are reflected in inflated advertising signs, cite locations.
3. List a number of political and economic reasons for the proliferation of advertising products.
4. Obtain a copy of the sign ordinance for the governmental unit in which he lives and for the state and/or federal highways in his state.
5. A task force of students will roam through the community (or along nearby state or federal highways) compiling a list and/or photographing illegal signs. Cite the specific ordinance or ordinances defied by each illegal sign.

B. The student will:
1. For one week place in a container any objects disposed of. Make a list of these objects in categories such as:
   a. packaging materials
   b. worn out products that he has used.
   Sub-divide the lists into biodegradable and non-biodegradable materials.
2. List examples of products used that are found in advertisement on the way to school.
3. Survey a section of a primary highway and determine what methods can be utilized to improve the aesthetic value of the right-of-way.
4. Construct a slide test for a five mile section of road in your community, which you are sure your classmates travel regularly, to determine how much of the visual material can be placed in that section by your fellow students.

C. The student will:
1. List ten commercial products and compare on a personal evaluation sheet considering
   a. Texture
      1. sculpture
      2. rough
      3. smooth
      4. hard
      5. soft
      6. simulated
      7. natural
   b. Size
      1. intense color
      2. faded color
      3. bold lettering
      4. fine print
      5. graphic effort
2. Visit an industry and see if the color of the outside can interest or if such an idea was ever considered.
3. Research the plans of the local highway department for new roads to determine what plans are to be instituted to prevent visual boredom and fatique.
4. Construct two objects that he would normally buy. He will

use natural materials in the construction of one and man-made materials in the construction of the other. The student will evaluate his feelings concerning the value he places on these objects relative to each other and relative to the value he places on the objects he buys.

D. The student will:
   1. Make a list of ten industrial products which are obvious simulations of natural materials. Bring in samples for comparison consider:
      a. texture
      b. degree of naturalism
      c. cost of production and/or product.
   2. List natural and synthetic materials that are used within his home.
   3. The class will be divided into two groups. One group will build an "environment", big enough for one person to enter and explore, completely from man-made materials. Group two will do the same thing using only natural materials. Each group will discuss the project considering:
      a. associations with sensations
      b. color
      c. texture
      d. degree of naturalism

SCENIC POLLUTION

CONCEPT	STRATEGY	EVALUATION
Concept A Man has ignored the visual effects from an aesthetic viewpoint of his advertising action. Concept B Larger size, repetition and the concept of the new and improved have had a detrimental effect on the conscious and unconscious feelings for the visual environment.	1. Record (with a camera) the number of occurrences of the same advertising image that you see on your commuter route. Make a list of the intervals (distance between the occurrences). 2. Make a list of products which you see daily which are reflected in inflated advertising signs - cite locations. 3. For one week the student will place in a container the objects he disposes of. Make a list of these objects in categories such as: a. packaging materials. b. worn out products that he has used. He may sub-divide the lists into biodegradable and non-biodegradable materials. 4. The student will list examples of products which you use that you have found in advertising on your way to school. 5. The student will survey a section of a primary highway and determine what methods can be utilized to improve the aesthetic value of the right-of-way.	1. The student will prepare a written list, or give an oral report, or give a slide presentation on the classes of scenic pollution. 2. The student may use any combination of the above to indicate his knowledge of the classes of scenic pollution. 3. The student may use <u>any</u> form of communication to demonstrate that he understands the classes of scenic pollution (for example, as a collage or a montage). 1. The student will participate in group discussions and be evaluated by his peers on his understanding of the relationship between commerce, advertising and scenic pollution. 2. The student will submit a written report on the relationship between commerce, advertising and scenic pollution. 3. The student will give an oral report utilizing a slide presentation. 4. The student will create a film to show the relationship between commerce, advertising and scenic pollution.

CONCEPT	STRATEGY	EVALUATION
A. (continued). B. (continued).	6. Construct a slide test for a five mile section of road in your community, which you are sure your classmates travel regularly, to determine how much of the visual material can be placed in that section by your fellow students.	

SCENIC POLLUTION

CONCEPT	STRATEGY	EVALUATION
Concept C Repetition and large size in advertising and architecture have encouraged insensitivity to quality judgments in the natural environment and have not encouraged man to feel value for the products of his own hand.	1. Workshop on propaganda techniques. 2. Discussion in small groups. 3. Examination of visit on perception (seminars and lectures). 4. Walking tour of _____. 5. Interview business people who advertise and find out why they advertise. 6. Survey cost effectiveness of advertising. 7. Consumer poll - why products are bought. 8. Study of GNP - why it is necessary to increase per capita income. 9. Study philosophical assumption - "Advertising Creates Demand." 10. Find out degree to which neon signs interfere with reading highway signs. 11. Determine how much sign painters are paid per hour. 12. Read Visual Thinking, Anheim	1. The student will list X number of political and economic reasons for the proliferation of advertising products. 2. The student will design a "logo" and sell it to the class. 3. The student will design a package for a non-product using the most successful logo (see #2) and record response to package by class.

SCENIC POLLUTION

CONCEPT	STRATEGY	EVALUATION
C. (continued).	13. Visit highway department - see how much planning for future. 14. Find out how much money is spent on advertising. 15. Survey abandoned advertising signs. 16. Obtain a copy of the sign ordinance for the governmental unit in which he lives. 17. The student will research the plans of the local highway department for new roads to determine what plans are to be instituted to prevent visual boredom and fatigue.	

CONCEPT	STRATEGY	EVALUATION
Concept D Products which are simulations of natural materials might foster a sense of unreality and callous indifference toward the natural visual environment.	1. Compile ten commercial products and compare on a personal evaluation sheet considering: a. Texture (1) sculpture (2) rough (3) smooth (4) hard (5) soft (6) simulated (7) natural b. Size (1) intense color (2) faded color (3) bold lettering (4) fine print (5) graphic effort 2. The student will visit an industry and see if the color of the outside can interest or if such an idea was ever considered. 3. The student will construct two objects that he would normally buy. He will use natural materials in the construction of one and man-made materials in the construction of the other. The student will evaluate his feelings concerning the value he places on these objects relative to each other and relative to the value he places on the objects he buys. 4. Make a list of ten industrial products which are obvious simulations of natural materials.	1. Compare characteristics of natural and synthetic materials. 2. Make a list of ten (additional) commercial products which are simulations of natural materials. 3. Given ten objects, the student will classify them as natural or synthetic. 4. Have student make a drawing of how much of his immediate environment would remain if all synthetic materials were removed (a photographic collage). 5. Have students give oral reports or keep a diary about his feelings toward the objects he makes and buys.

SCENIC POLLUTION

CONCEPT	STRATEGY	EVALUATION
D. (continued).	4. (continued) Bring in samples for comparison, consider: a. texture b. degree of naturalism c. cost of production and/or product. 5. The student will make a list of natural and synthetic materials that are used within his home. 6. The class will be divided into two groups. One group will build an "environment," big enough for one person to enter and explore, completely from man-made materials. Group two will do the same thing using only natural materials. Each group will discuss the project considering: a. association with sensations b. color c. texture d. degree of naturalism	

A general strategy which may apply to most objectives would be to group the students and assign topics to each group. The group would have to develop a complete argument, both pro and con, on the issue.

On Evaluation Day, the group would be told whether they were to give the pro or con argument and be evaluated on their presentation. It is suggested that peer group leaders be developed for this activity.

WILDLIFE AND MAN
Alternative #1

I. OVERVIEW

This module seeks to determine wildlife's place in the environment with respect to man. It is intended to show that wildlife is an integral part of man's environment, and that his activities affect the wildlife around him either negatively or positively. This module attempts to point out some of the errors that man has made in the past, and some of the losses and disasters that have occurred as a result of man's ignorance, greed, or thoughtlessness.

An attempt is made to show how man can profit from his past mistakes and strive to protect endangered species, regional and local wildlife populations, and the natural wildlife balances.

It should be noted that man occupies center stage in this module not because of any belief that the varieties of wildlife species are here to serve man. Rather, man is the central focus of this module out of recognition of his power to destroy or conserve the world's wildlife.

II. CONCEPTS

A. Wildlife is an integral part of man's environment.

B. Wildlife is an indicator of man's survival.

C. Man as the dominant species, has a responsibility to protect wildlife.

D. Wildlife provide recreational, aesthic and practical benefits for man.

E. Man and Wildlife are biologically inter-dependent.

F. The maintenance of a stable wildlife environment is necessary to man's well being.

G. Man and Wildlife are psychologically interdependent.

H. Wildlife have intrinsic value.

III. STUDENT OBJECTIVES

A. The student will:
   1. Be encouraged to become an environmental activist.
   2. Outline an Eco-system in which Man and Wildlife interact.
   3. List five ways that individual wildlife species affect man.
   4. List five ways that man affects the wildlife.

B. The student will:
   1. Provided with five pictures of different environments, select the ones with maximum survival value and defend his selection.
   2. Develop an example of wildlife depletion case study.

C. The student will:
   1. List five ways in which effective political action could be taken to protect an environmental species of wildlife.
   2. Given a series of wildlife crises situations: the student will select the appropriate choices in favor of wildlife preservation (3-10).
   3. Form an investigative group to determine local wildlife environmental problems.
   4. List the endangered species in your locale.
   5. Demonstrate a number of techniques in documenting environmental pollution case studies.
   6. List the local organizations concerned with wildlife preservation.

D. The student will:
   1. List a number of uses of wildlife for recreation pruposes.
   2. List a number of uses of wildlife for economic purposes.
   3. List a number of uses of wildlife for aesthetic purposes.
   4. Outline the place of wildlife in man's art.

IV. RESOURCE MATERIAL

1. Greater Cleveland project on Man & Environment
2. The Timber Wolf Story - Book
3. Weyerhouser Company propaganda
4. Wolf sounds - phonograph disc
5. Detweiler Thomas - (book) compilation of materials on wildlife.

WILDLIFE AND MAN
Alternative #2

I. OVERVIEW

This module seeks to determine the place of wildlife in the environment. It is intended to show that wildlife is an integral part of man's environment, and that his activities affect the wildlife around him. This module attempts to point out some of the benefits derived from effective planning by pioneers in the wildlife field as well as some of the errors that man has made, and some of the losses and disasters that have occurred as a result of man's ignorance, greed and thoughtlessness.

Man must profit from his past mistakes and strive to protect endangered species, regional and local wildlife populations, and the natural wildlife balances.

It should be noted that man occupies center stage in this module not because of any belief that the varieties of wildlife species are here to serve man but rather that man is the central focus of the module out of recognition of his power to destroy or conserve the world's wildlife.

II. CONCEPTS

A. We must assess wildlife's place in the environment.

B. Man benefits from wildlife.

C. Plans must be developed for beneficial wildlife management.

D. A thorough analysis is needed of those activities of man detrimental to wildlife.

E. It is man's responsibility to conserve and protect wildlife.

III. STUDENT OBJECTIVES

A. The student will:
   1. Name the three criteria of producer populations, aquatic, terrestrial, atmospheric.
   2. Identify the principal elements of the earth's energy system.

3. Construct a diagram illustrating the flow of energy through an eco-system.
4. Describe the relationships in the community among the producers, consumers, and the decomposers.
5. Prepare a list of five examples of the reproductive potential of wildlife.
6. Construct a list of the various environmental factors that affect wildlife populations.

B. The student will:
1. List at least three wildlife activities economically beneficial to man.
2. List at least three wildlife activities recreationally beneficial to man.
3. Prepare a research paper of at least 500 words illustrating the various ways wildlife may affect man's environment.
4. Discuss three examples of pest or predator control which have been of significant benefit to man.
5. Describe, by example, how the preservation of a predator may be beneficial to man.
6. Discuss how international cooperation is necessary for the preservation of beneficial wildlife species.

C. The student will:
1. List at least five acts of federal legislation directly related to wildlife management.
2. List at least five local acts or laws of state legislation directly related to wildlife management.
3. Describe from a list of 15 federal or local laws or acts concerning wildlife management how at least five of them have benefited wildlife.
4. List and describe the primary purposes of at least three organizations working for wildlife management.
5. Develop and describe one project that could be carried out locally to protect wildlife.

D. The student will:
1. List at least two species which have become extinct in the present century and describe what caused their extinction.
2. List at least two species which are endangered today and describe the activities through which man has endangered these species and how they can be protected.
3. List at least three cases where wildlife industries have lead to the depletion of wildlife species and the reason for this effect.

4. List at least three cases where industrial pollutants have lead to the depletion of wildlife and the reason for this effect.
5. Explain how pesticides and over fertilization are detrimental to wildlife and give at least two reasons for each.
6. Describe at least one way that man is destroying a wildlife habitat in your community.

E. The student will:
1. Present an oral report appraising the overall bills in the state legislature dealing with wildlife.
2. List five federal or state agencies responsible for protection and/or conservation of wildlife.
3. Given a set of circumstances, what agency or agencies he should contact to facilitate action.
4. Obey wildlife conservation laws or ordinances.
5. Dramatize, by any means he desires, the need for adequate enforcement of wildlife laws.
6. List and defend five wildlife conservation practices presently in use in his state.
7. Discuss the global impact of man's responsibility to conserve and protect wildlife in the class panel format.

IV. RESOURCE MATERIAL

1. Audio-visual aids
2. Guest speakers
3. Field trips
4. Reference materials

WILDLIFE AND MAN

CONCEPT	STRATEGY	EVALUATION
CONCEPT A We must assess wildlife's place in the environment. OBJECTIVES 1. The student will be able to evaluate wildlife's place in the environment. 2. The student will be able to identify man's benefits from wildlife.	1. Student will make a movie 2. Conduct a diagram illustrating the flow of energy in eco-system. 3. Camping trip. 4. Discussion of reproductive potential of wildlife. 5. Discussion of various environmental factors that affect wildlife populations. 6. Case studies of local species. 7. Outline the life cycle of species and the intraction with environment. 8. Observe at least one local wildlife habitat. 9. Speaker from wildlife, forest, etc. 10. Debate opposing ideas. 11. Movie of wildlife's place in the environment. 12. Panel discussion of wildlife's activities benefits to man.	1. Test: Teacher option 2. Slides, Paper, Movie 3. Observation 4. Oral reports 5. Pop quiz 6. Group participation

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (Continued)	13. Interview of local wildlife federation or group. 14. Survey of public interest. 15. Student could work for local community agency. 16. View color slides and/or transparencies. 17. Read Silent Spring.	
3. Student will be able to identify various activities of man beneficial and detrimental to man.	1. Field trip to a wildlife refuge. 2. Legislator will speak on federal & state legislation directly related to Wildlife managemnet. 3. Panel discussion on objective. 4. Demostration showing effects of certain activities on Wildlife (e.g., white mice sprayed with DDT) 5. Speaker from local Wildlife organization.	1. Test (Teacher Option) 2. Pop Quiz. 3. Term Paper 4. Observation. 5. Oral Report 6. Self-Evaluation 7. Group Evaluation & Participation

WILDLIFE AND MAN

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (Continued)	6. Research on local species which have disappeared. 7. Interview with spokesman from wildlife industry. 8. Interview with speaker from wildlife habitat pollution or as class speaker. 9. Bring to class any pollutant 10. Case study for reason for law, i.e. 1) hunting licenses 2) fishing license 3) bag or catch limit 4) seasons 5) length of time of seasons. 6) sancturies 7) regulation of pesticides and other pollutants. 11. Class discussion on objectives 12. Students volunteer to work for local agencies. 13. Movie and other multi-media. 14. Student will make a list of wildlife journals.	

WILDLIFE AND MAN

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (Continued) 4. Students will be able to discuss man's responsibility to conserve and protect wildlife.	1. Role playing: Public Hearing 2. Stimulation game (i.e. coke game on community). 3. One idea from each student on how to protect wildlife. 4. Identify problems from photograph. 5. Discussion on endangered species and our responsibilty to conserve wildlife. 6. Case history of mule, deer, buffalo. 7. List those species endangered in their region. 8. Speaker on work of goverment in protecting wildlife. 9. Student will write letter to Congressman. 10. Participate in local organization. 11. Case study of firearm industry in conservation. 12. Case study of man's desire to kill or sport and how it relates to conservation.	1. Oral Report 2. Written Report 3. Group Participation 4. Peer Evaluation

WILDLIFE AND MAN

CONCEPT	STRATEGY	EVALUATION
CONCEPT A (Continued)	13. Examination of over-kill of species. 14. Investigation of man's carelessness. 15. Discuss man's packaging of food products & wildlife (gull head in beer 6 pack case). 16. A panel discussion of the global impact of man's resposibility to conserve and protect wildlife.	

SOIL AND MAN
Alternative #1

I. OVERVIEW

The student will investigate local soils through personal experience in the field, or use samples and examples which have been prepared for the classroom. This gives him a background for understanding the definition of soil, and prepares him for determining the constituents of a soil. After investigation and experience with local soils, the student may then study and compare world soil classes and types, and how they affect him personally, as well as the impact they have on various world cultures.

With this background, he may better understand the relationships within the soil community, and the interrelationships with surrounding environments. Value judgments can be developed by investigation of local and world uses of soils and soil products. Through a contemporary and historical approach, the student develops an awareness and understanding of the abuses and misuses of soil resources. Personal involvement may be put into perspective by attaining an awareness of the citizen's role with respect to social, governmental, economic, ethnic and religious factors.

The most significant concept arrived at in this module might be that of developing and implementing conservation practices in our multi-use of soils. This might come through using the historical approach basis. Thus leading to an investigation of contemporary soil conservation practices and their impact on man.

II. CONCEPTS

A. Soil in its natural state represents a system built by its surroundings.

B. The history of soil composition indicates that soil has varied especially as a result of climactic conditions. However since the agriculture revolution, man's increased influence on his environment has changed the composition of soil more rapidly than natural controls tend to operate or man-made controls have been instituted.

C. The role of soil in maintaining the nutrient cycles is vital to maintenance of life on earth.

D. Attempts to improve the quality of the soil must be evaluated in terms of their overall effect on eco-systems.

III. STUDENT OBJECTIVES

A. The student will:
   1. Explain the role that the following factors play in soil building.
      a. bedrock
      b. bacteria
      c. water
      d. earthworms, insects
      e. various plants such as lichens, mosses, fungi, ferns, shrubs and trees.
      f. larger animals such as moles and squirrels
      g. temperature
   2. Make a compost heap and observe its composition over one academic year analyzing the rates of decomposition according to the specific materials involved.
   3. Remove one square foot six inches thick of winter soil. Heat for two or three hours in a container and observe the migration of living organisms.
   4. Compare the above with a like sample of city soil. Observe:
      a. color
      b. texture
      c. water content
      d. plant and animal life

B. The student will:
   1. Superimpose, on a map of the United States, a chart identifying and separating soil types according to region. Relate soil types to the climate.
   2. Construct three inclined soil sample boxes, the first containing 1/3, the second 1/2 and the third all vegatation cover. With running water demonstrate the effects of plant life on soil erosion.
   3. In vertical columns of soils of different compositions, demonstrate the percolation rate of water.
   4. Design an experiment to demonstrate the capillary action of water in soils of different texture.
   5. Explain how misuse of the soil has influenced the development of past civilizations.
   6. Explain how man's activities, in your geographic area, effects the soil.

C. The student will:
   1. Determine and compare the PH of the soil in the following:
      a. pine forest
      b. oak-hickory forest
      c. cornfield
      d. pasture
   2. Explain, in general, how the nitrogen cycle tends to replenish the soil. Explain why nitrogen is essential to all living organisms.
   3. Explain the role of soil in the carbon cycle. Evaluate such as (a) strip mining, (b) road building and (c) industrial and/or residential developing on the ability of the soil to carry out the carbon cycle.

D. The student will:
   1. Consider farm land that is poor in nitrogen content. Suggest at least two ways to improve this soil. Evaluate both methods in terms of their possible effects on (a) the local aquatic eco-system, (b) the local terrestrial eco-system.
   2. Compare the rate of algae growth in aquaria to which have been added:
      a. 10-10-10 fertilizer
      b. tide
      c. potassium phophate
      d. urea
      The aquaria are initially filled with de-ionized water.

INTERGROUP TENSIONS
Alternative #1

I. OVERVIEW

Intergroup tensions of various types are all about us. The causes and effects of this problem have, in turn, a profound effect on our nation and society. An understanding of these causes and effects is necessary in order for man to reduce and adapt to these tensions.

II. CONCEPTS

A. High density conditions in our urban areas bring about social and personal frustrations.

B. Groups of individuals with different values and beliefs almost inevitably experience social and personal frustrations resulting in antisocial and personally destructive behavior.

C. Social groups require political organization and this can work for and against a group.

D. Historically man seems to bristle against differences of all kinds. In order to reduce intergroup tensions, it will be necessary to educate toward understanding the validity of these differences and the general unity of the human race.

III. STUDENT OBJECTIVES

A. The student will:
   1. List any number of behavioral characteristics that result from high density in rats. Relate these to human behavioral characteristics that you have observed.
   2. List any number of kinds of problems that might arise in (a) a high population low income group, (b) a high population high income group.
   3. Survey ten blocks area in a high density neighborhood and note the recreation facilities such as mini-parks and portable swimming pools.

B. The student will:
   1. List any number of problems that might arise in a racially mixed neighborhood. Explain how these problems differ in high income neighborhoods and low income neighborhoods.

2. Define psychosomatic disease. Give a number of examples. Explain how social and personal frustrations can lead to psychosomatic disease (biological mechanisms).

C. The student will explain ways in which the administrative organization of this school has disrupted one or more of his educational or personal plans.

D. The student will:
1. Take a census to discover the ethnic composition of a ten block area in your neighborhood. Construct a chart indicating that data and have it distributed to each neighbor via committeemen or civic association.
2. Using the ethnic information from #1, construct an information sheet indicating twenty historical and cultural factors about each group. Distribute in like manner.

INTERGROUP TENSIONS
Alternative #2

I. OVERVIEW

Intergroup tensions of various types are all about us. The causes and effects of these problems have, in turn, a profound effect on man's social and physical environment. Remedies must be sought to cope with these problems.

II. CONCEPTS

A. The heterogenous nature of our society contributes to intergroup tensions.

B. Intergroup tensions can produce positive and negative results in both our social and physical environment.

C. Remedies to problems in man's social and physical environment caused by intergroup tensions must be developed through intergroup action.

III. STUDENT OBJECTIVES

A. The student will prepare a list of the groups that he feels contributes to tensions in the environment.

B. The student will:
   1. Using information gathered from the news media (and personal experiences) list three examples in which intergroup tensions have produced positive results;
      a. social environment
      b. physical environment
   2. Using information gathered from the news media (and personal experiences) list three examples in which intergroup tensions have produced negative results;
      a. social environment
      b. physical environment

C. The student will:
   1. Cite an instance in which he feels intergroup tensions have been alleviated by communication and/or educational processes.
   2. Using a specific environmental situation, list several procedures which may be used to solve problems caused by intergroup tensions.

IMPACT OF POLITICAL SYSTEMS
Alternative #1

I. OVERVIEW

All citizens of the U.S. live within a political system. It is necessary to examine the operation of all levels of the system and their effect on environmental problems. Attempts will be made to determine alternate, effective responses to such problems.

II. CONCEPTS

A. The basic units of the U.S. political system are local, state and national.

B. A knowledge of the functions and operations of the various levels of government is necessary for intelligent political action.

C. Political systems are a reality in U.S. life and effective political action is a way of accomplishing goals.

D. In a political system which is dependent upon democratic processes, individual initiative which culminates in group effort is the means for bringing about political action.

E. The environmental impact of alternative political actions requires careful analysis.

III. STUDENT OBJECTIVES

A. The student will become familiar with the roles of the three major levels of the political system. (local, state, national)

B. The student will:
   1. Discuss environmental problems which could be solved at:
      a. local level
      b. state level
      c. national level
   2. Cite an example of what is being done about environmental problems:
      a. local level
      b. state level
      c. national level

C. The student will:
   1. Cite an example of effective political action on environmental problems at the:
      a. local level
      b. state level
      c. national level
   2. List influential (pro and con) groups which bring about political action on environmental problems:
      a. local level
      b. state level
      c. national level

D. The student will:
   1. Cite a specific example in which individual initiative resulted in solution of an environmental problem.
   2. List the steps an individual could take in order to begin political action on a given environmental problem.

E. The student will:
   1. Determine the alternatives, rationale and possible environmental impact of a recent political action.
   2. List political actions in other countries which effect our environment.

IV. RESOURCE MATERIAL

1. Daily newspapers/public issues
2. Guest speakers
3. Resource books/show what has happened in years past (good and bad)

IMPACT OF POLITICAL SYSTEMS
Alternative #2

I. OVERVIEW

All men live within a political system. Therefore, it is necessary to examine the manner in which differing political systems make environmental decisions and the varying ways that these systems respond to environmental problems.

II. CONCEPTS

A. Differing political systems vary in their response to environmental problems.

B. Political systems facilitate and/or obstruct enlightened environmental strategies.

C. The complexity of environmental problems is of such magnitude that various political levels within a system can have conflicting interests. Indeed, various segments of the same level are often in opposition with each other.

III. STUDENT OBJECTIVES

A. The student will:
   1. Define a political system.
   2. Define a centralized form of government.
   3. Define a decentralized form of government.
   4. Outline an environmentally responsive political model.

B. The student will:
   1. List five strategies available to the concerned citizen for solving environmental problems through existing political systems, checking his method and defending it.
   2. Develop a table of governmental organization defining the various levels of the system in which he lives (local, county, state and federal).
   3. Outline the current decision-making structure in the local government by specific individual and office.
   4. Write to one political decision-maker at each level of government, using a political table of organization and ascertain his record of involvement with environmental issues (voting record and bills presented).

5. Compare the concept of centralization vs. decentralization in the context of environmental decision-making.

C. The student will:
1. List the elements of the environment which should be under central governmental control.
2. List five steps you might take to affect the political structure in his community toward an environmentally responsive government.
3. Define the political power structure of the U.S.
4. Describe the local political system under which he lives.

IV. RESOURCE MATERIAL

1. The Corporate Prince
2. Up the Organization

IMPACT OF POLITICAL SYSTEMS

CONCEPT	STRATEGY	EVALUATION
Concept A Differing political systems vary in their response to environmental problems. OBJECTIVES: 1. Define a political system. 2. Define a centralized form of government. 3. Define a centralized form of government. 4. Outline an environmentally responsible model.	1. Let the class function in a state of "anarchy" for a specified period of time to demonstrate the need for processes defined procedures. 2. Develop a stylized flow chart of the political system of several nations. 3. Look up several formal definitions of a "political system" in sources such an Encyclopedia Britannica, Encyclopedia of Social Sciences, etc. 4. In small groups, students will design a political system and implement the system in class. 5. Develop a general model for what a political system achieves - to include the function, the population units, the distribution of goods, etc. 6. Interview the County Chairmen of the Democrat and Republican parties to get their operational definitions of what a political system is.	1. Write or recite a definition of the term, political system. 2. Give a written or oral definition of the term, centralized form of government. 3. Give a definition of the term, "centralized form of government." 4. Develop a system of government describing the various levels of responsibility and showing how they relate to the environmental problems.

IMPACT OF POLITICAL SYSTEMS

CONCEPT	STRATEGY	EVALUATION
Concept B Political systems facilitate and/or obstruct enlightened environmental strategies. OBJECTIVES: 1. List 5 strategies available to the concerned citizen for solving environmental problems through existing political systems (check your method and defend it). 2. Develop a table of governmental organization defining the various levels of the system in which you live (local, county, state and Federal). 3. Outline the current decision-making structure in your local government by specific individual and office. 4. Write to one political decision-maker at each level of government in your political table of organization and ascertain his record of involvement with environmental issues. 5. Compare the concept of centralization vs. decentralization relative to the concept of environmental decision making.	1. Design a flow chart of the students' municipal government. 2. The teacher will provide class sub-groups with decision-making strategies (or rules). Each group is to reach a decision on the same (specified) environmental problem using the assigned rules. Reassemble to analyze the process in each group. Example: Each group is to pick the site for a power plant using: a) socialist government format b) unlimited democracy c) representative systems, etc. 3. Identify a critical environmental issue in your area. Develop a political map of Senators & Representatives. Select 5 and write to them. Analyze the responses in terms of answering your questions. Follow up on the correspondence and maintain a portfolio in attempting to get direct answers. 4. Obtain a copy of the environmental Protection Act., analyze it for strengths and weaknesses. Can it provide a basis for environmental responsiveness?	1. Given a specific environmental problem (to be determined by the instructor) list five ways of effecting a change. 2. List the name and office of the various elected officials representing you on the local, county, state and Federal levels. 3. Review in outline form how decisions are made in your local government. 4. Evaluate the voting record of one of your U.S. Senators in regard to environmental issues. 5. Give the advantages and disadvantages of political centralization vs. decentralization in regard to environmental problems and state which system you prefer.

IMPACT OF POLITICAL SYSTEMS

CONCEPT	STRATEGY	EVALUATION
Concept B (Continued) OBJECTIVES 1 - 5 (Continued)	5. Develop a sample petition. 6. Write letter to the editor. 7. Pile old newspapers on courthouse steps. 8. Identify a local problem & design 5 strategies to deal with that problem. 9. Compulsory attendance at some hearing -- building, zoning petitions. 10. Organize a hearing relative to some specific problem. 11. File for candidacy and actually run for office or actively support a candidate or representative. 12. Find out if your state or county has an initiatory procedure and what is required to get an issue on the ballot. 13. Panel of students interviewing a judge or official of some sort - rules of debate to determine whether or not question was answered. 14. Taking a specific local problem - interview local, state and national representatives or officials to find out where power ought to reside. What are problems of diffuse power? What are advantages and problems of centralized power.	

IMPACT OF POLITICAL SYSTEMS

CONCEPT	STRATEGY	EVALUATION
Concept C The complexity of environmental problems is of such magnitude that various political levels within a system can have conflicting interests.	1. Get students to register to vote. 2. Students should select an environmental problem and adopt a viewpoint. They should attempt to "walk the problem through" City Hall. Did officials deal with problem or circumvent the issues? How did they respond to differing sets of demands from differing groups? 3. Go out and picket relative to some specific local problem. What are people's reactions? What different perspectives can you identify?	1. Write down the advantages and disadvantages of the following 5 methods of effecting change in the political structure (the goverment level to be determined by the instructor): Picketing, petitioning, referendum, class action suits, special interest group pressure. 2. Specify how your state constitution provides the framework for political power. 3. Specify how your city charter provides the framework for political action.

IMPACT OF POLITICAL SYSTEMS
Alternative #3

I. OVERVIEW

Regardless of what conclusions men arrive at through scientific or technological information, implementation of intelligent environmental decision-making requires the addition of political consideration. Therefore it is necessary to examine the parameters and functions at all levels of political systems and develop functional skills and knowhow in working with all three considerations; political, technological and scientific. We must recognize that political systems offer both obstacles and opportunities in environmental decision-making and that environmental action requires citizen organization and participation.

II. CONCEPTS

A. Intelligent environmental decision-making requires a mix of technological, scientific and political considerations.

B. The political system offers both obstacles and opportunities in environmental decision-making.

C. Environmental decision-making is intergovernmental.

D. Environmental action requires citizen organization and participation.

III. STUDENT OBJECTIVES

A. The student will:
   1. Describe the role of scientists, technologists and politicians in decision-making.
   2. Research and prepare to discuss, one example of a decision based on:
      a. only political considerations
      b. only scientific or technical consideration
      c. one example that makes an attempt to involve both.
   3. Design a possible solution to a hypothetical situation that meets the requirements of science, technology and politics.
   4. Given a hypothetical problem (e.g. pollution problem caused

by industry for which solution requires the closing of the factory), record reactions by putting himself in the place of the factory worker, employer or resident.

B. The student will:
   1. Cite a case whereby environmental abuse resulted from a purely political decision.
   2. Given the situation where science can retard the aging process, present the political costs and benefits in dealing with this development.
   3. List five constraints the political system imposes on environmental decisions.
   4. List five advantages of political decison on environmental decisions.

C. The student will:
   1. Cite five cases whereby more than one level of government is involved in the same environmental problem.
   2. Select one of the above and analyze the need for the intergovernmental involvement.
   3. List advantages and disadvantages of centralization.
   4. Select a local environmental problem and identify which political units have jurisdiction over it (e.g. administrative, legislative, judicial).

D. The student will:
   1. List limitations upon individual action.
   2. Discuss a particular environmental organization with regard to:
      a. membership
      b. organization
      c. strategies
      d. beliefs
   3. Give one example where group action succeeded in making a change in political decision.

IMPACT OF ECONOMIC SYSTEMS
Alternative #1

I. OVERVIEW

Economic systems influence the way men think about environmental problems. These systems explain ways different cultures, nations, and economic systems allocate resources to satisfy their needs and desires. However, resources are limited and the rape of the environment is an inefficient method of allocating resources, thus avoiding an attempt to confront survival problems. The economic policies of different nations will affect the world eco-systems. International bodies are developing an awareness of eco-problems.

II. CONCEPTS

A. Economic systems exert a major influence in shaping man's perception of the environment.

B. Any basic economic system has a potential to preserve or destroy the environment.

C. International cooperation is essential for the solution of environmental problems.

D. The advanced industrial economic systems are exploiters of the environment and the greatest contributors to world-wide pollution.

III. STUDENT OBJECTIVES

A. The student will:
   1. List the four factors which make up the essentials of any economic system.
   2. Describe the difference between a need and a want.

B. The student will:
   1. Perform an analogue area analysis using Israel and Chile in order to determine effects of two different economic systems on similar landscapes.
   2. How would you change your life style in order to effect a lower rate of consumption of the natural resources and maintain an environmental balance?
   3. List differing ways in which various economic systems impact the environment.

C. The student will:
   1. List three examples of international cooperative action in the environmental area.
   2. List five major obstacles to international cooperation in solving environmental problems.
   3. Develop a speech as Secretary General of the United Nations in an annual session of the U.N. General Assembly dealing with economic systems and the environment.

D. The student will:
   1. Compare the rate of consumption of natural resources as it relates to the standard of living in an undeveloped country with an industrial nation.
   2. Describe the way the standard of living of a society affects the rate of consumption of its natural resources.
   3. Given 30 billion dollars, list what you would do for the solution of environmental problems in the United States.

IV. RESOURCES MATERIALS

1. The Stockholm Environmental Conference - a case study.
2. "No Blade of Grass" - film.
3. "The World We Live In" - a series of six films from the Public Broadcast Laboratory.

MEDIA AND THE ENVIRONMENT
Alternative #1

I. OVERVIEW

The media play a key role in disseminating information as well as shaping attitudes and values. The media can be utilized either in a beneficial or a detrimental fashion in relation to exposing environmental ideas. It is imperative that environmental education use the media to promote environmental literacy in society.

II. CONCEPTS

A. Human survival has historically depended upon effective communication--first utilizing simple media then developing highly complex communication systems having the power to direct human destiny.

B. Different segments of society have differing abilities to be heard through the media because of our eco-political power structure.

C. Adequate interpretation of environmental events reported through the media requires increased sophistication if human values and behavior are to be modified in relation to changing environmental needs.

D. The media are significant sources of sensory pollution.

E. Media skills can be used to bring about environmental change.

III. STUDENT OBJECTIVES

A. The student will:
   1. Describe the ways the following cultures used mass communications to influence the actions of their contemporaries.
      a. Ancient Egyptians
      b. African Bushmen
      c. Ancient Greek Civilization
      d. Ancient Rome
      e. American Indians
      f. Modern Western Civilization

2. Itemize methods for human communication.
   a. Using the items listed above, student will graph the number of methods used vs. time and identify those points in time when technology has dramatically increased the effectiveness of communication.

   b. Evaluate the implications of the data of parts A and B as it relates to environmental awareness.

3. Describe at least three ways each of the following media affects behavior:
   a. news telecasts
   b. editorials
   c. periodicals

4. Describe six different propaganda techniques used by advertizers to sell their products.

5. List five specific media sources which have affected his personal actions within the past week.

6. List those sounds of information collectively described as "media" and indicate on a clock/time basis the amount of time they have spent with each during one day.

B. The student will:

1. Given a weekly news magazine, classify each article based on the following systems:
   a. Governmental press release
   b. Corporate press release
   c. Publicity on a "public" figure
   d. Articles dealing with average individuals
   e. "Feature" material researched on a given topic by the magazine

2. Quantify the relative proportion of "visibility" of different segments of the local society by the environmental news which is presented by the:
   local newspaper
   local radio or T. V. station monitored for a one-week period i.e. that which is generated by industry commerce, public agencies, private individuals, editorials.
   Evaluate the implications from any bias in the environmental news coverage revealed in the above survey.

3. Editorialize on the pollution of Lake Erie from the following points of view that of :
   a citizen of a community bordering on the lake
   a Californian
   a person who resides in the British Isles
   or
   through the eyes of different people, such as:
   the individualist
   the student
   the sportsman

C. The student will:
   1. Bring in all printed material from the daily newspaper assessed to have an influence on improving the environment in their community.

   2. Evaluate a given environmental controversy in the community: As a group will corporately choose a problem and develop a position paper--1-2 pages--based on a community role assigned them by the group (i.e. writing as president of the Chamber of Commerce, etc.).

   3. Critique the presentation of a local environmental problem reported in the newspaper noting:
      a. objectivity of presentation
      b. probable impact
      c. input

   4. Analyze a major advertizing campaign pointing out positive and negative aspects of the campaign.

D. The student will:

   1. List specific events of sensory pollution from one media source within one week's time.

   2. Listen to one hour of the total radio programming of one station and evaluate the material presented on the basis of attempted behavioral modification.

   3. Survey his local area and identify 25 specific sources of sensory pollution brought about by communication media, classifing into the general categories he deems appropriate and obtain a copy of the local sign ordinance for discussion.

E. The student will:

1. Develop his own definition of propaganda.

2. Plan a media campaign on a current environmental issue in the community stressing:
   a. What media shall be used.
   b. How should it be presented.
   c. "Who" should sponser this campaign?

3. Analyze the role of sensationalism in our daily paper.

4. Participate in an organized campaign to reduce air pollution caused by yesterday's newspaper.

B I B L I O G R A P H Y

The following bibliographical entries have been suggested by faculty participants and complete information is not available:

BOOKS

Arnheim, R., Visual Thinking

Basic Course in Organic Gardening, Rodale Press, Allentown, Penn.

Caldwell, Lynton K., Environment: A Challenge for Modern Society, Natural History Press, 1970.

Cassirer, E., An Essay on Man, Pbk.

Davier, J. Clarence, III, The Politics of Pollution, Pegasus, 1970, New York.

Dubos, Rene, Man Adapting, Yale Univ., Press, 1965.

Erlich, Paul, Population Bomb.

Everymans' Guide to Ecological Living. (Santa Barbara Underseas Foundation).
Ghiselin, Brewster, The Creative Process, Pbk. Ed.
Handler, Philip, Biology and the Future of Man, Oxford Univ. Press 1970, Pbk.

Man's Impact on Global Environment, MIT Press, 1970, Paperback.

Nearing, Helen & Scott, Living the Good Life. (Check spelling of authors name)
Pastmen and Wiengark, Teaching as a Subversive Activity.
Percy, Walker, Love in the Ruins, Pbk.

Proshausky, Harold. Helson, W. H. & L.G.R., Environmental Psychology: Man and His Physical Environment, Holt, Rinehart and Winston.

Reich, Freda Fromm, I Never Promised You a Rose Garden, Pbk.

Resources and Man: A study and Recommendation Committee on Resources and Man, NAS-WRC, Freeman and Co., Pbk. 1970.

Reville, Roger and Landsberg, H.H. (Eds), America's Changing Environment, Houghton Mifflin,1970.

Steinbeck, John, Log from the Sea of Cortez. Novel useful in giving students a feeling for the sea. A "Marine Biologist", collecting data. Students enjoy reading this.

Wagner, Richard, Environment and Man.

FILMS

Alone on the Face of the Land

Becoming an Employee. Envir. Prot. Agency, Wash. D.C. 20460. Cornell Univ. Ithaca, N.Y. (free film)

The Cave Community

The Community

The Desert

What is Ecology?

Ecological Succession

Future Shock (free film)

The Gifts Modern talking pictures and shell oil distributes

The Grosslands

Groundwater - The Hidden Reservoir

The High Arctic Biome

The Life and Death of American Cities - Jave Jacobs

The Marine Biome
The Noise Boom
Plankton and the Open Sea

Population Ecology

The Question Tree - Film Library Indiana Univ. - Bloomington, Indiana

Take a Deep and Deadly Breath

The Temperate Deciduous Forest

The Tropical Rainforest

What we are doing to our World

Who Killed Lake Erie

Why Man Creates - Pyramid Films C.B.S. flim (Rental Prints available)

Burgess Publishing Co. has a series of 35 mm. slides on Air and Water Pollution.

For people in Fla. for $35 you can get a script and 120 slides from Conservation 700 in Tallahassee for an excellent overview of environmental problems in Fla.

RESOURCE SUGGESTIONS

1. Air Pollution Control Association. Cinti, Ohio.

2. CCC- Handbook (Civilian Conservation Corps) 1932,Field Techniques in Reforestation.

3. Cities Halprin. Reinhold(?)

4. Design With Nature. Ioan MacHarg

5. Ecological Monographs (See Reese J. Taylor, Sumter Area Tech., Sumter, S. Carolina)

6. Environment (Journal)

7. Journal of Environmental Health. Natl. Environ. Health Assoc. 1600 Penna St. Denver, Colo.

8. Guidelines for Preparation of Environ. Technics.
   MDTA. Environmental Health Service, PHS
   Dept. HEW
   Room 18-81 Parathanon Bldg.
   5600 Fishers Lane
   Rockville, Maryland 20852

9. Landscape Architecture. McLeansville, Va.

10. Natl. Inst. Occupat. Safety & Health. Wash. D.C.

11. Natl. Safety Council. Chicago, Ill.

12. National Sanitation Foundation. Ann Arbor, Michigan

13. National Science Foundation. Wash., D.C. 20550. (Funding for Student Projects)
    SOS Program. Independent Environmental Research.

14. Natl. Water Pollution Control. 3900 Wisconsin Ave. N.W. Wash, D.C.

15. Operation of Waste Water Treatment Plants
    Prof. Kenneth Kerri, Dept. of Civil Engr.
    Sacramento State College
    6000 Jay St.
    Sacramento, Calif.

16. Rent free slide cassettes. National Training Center. 4676 Columbia Pky.
    Cinti, Ohio 45268

17. Operator's Training Manual for Waste
    Water Treatment attn. Mr. Henry Gibson
    P.O. Box 1'628
    Cleuison Univ.
    Columbia, S. Carolina 29211

18. Univ. of Wiscon. , at Madison
    Bibliography in Environ. Educ. Madison, Wiscon.

19. U.S. Dept of Agriculture Bulletins. U.S. Govt. Printing Office.
Wash. D.C. 20242

20. Waste Water Treatment
Power Reader Services Dept.
340 W. 32 St.
New York, N.Y.

21. Yearbooks of Agriculture
U.S. Govt. Printing Office
(Land, Forests, Water, Soil, Grasslands, A Place to Live, Destructive Insects)

TEACHER MADE MATERIALS

Brevard Jr. College
c/o William Wenz
Cocoa, Fla.
Has developed a course and materials are available

Colorado's Environmental Plan
Hershel Nelson
Polk Community College
Winter Haven
Florida 33880

Kirkwood Community College
1 yr. (calendar) "across the board"
All environ. Voc. Tech. Programs
Harold Bicort - Chief of environmental programs
6301 Kirkwood Blvd.
Cedar Rapids, Ia. 52406

Kirkwood Community College
Bill Rosberg
Cedar Rapids, Ia. 52406
"Clearwater" Cassette and film strip E.R.A.

M-DJC Downtown Campus
Annotated bibliography and 8 Module EEE course
141 N.E. 3rd Avenue
Miami, Fla. 33132

M-DJC South Campus
11011 S.W. 104th Street
Miami, Fla. 33156
Division of Intercurricular Studies Objectives Packet
(Objectives for interdisciplinary appr. to general ed.)

Piedmont Community College
35mm slides on air, water, and solid waste pollution in Western N.C.
Film on attitudes toward environmental problems in process at Western Piedmont Community College. Don't know exact title 8mm. Student made.
Morganton, N.C.

Penn. State (Ogontz Campus)
Will be developing a slide chronicle of Project 3 Cities . A course in visual and aesthetic city environment.

Middlesex County College
Ronald B. Krauth
Edison, New Jersey 08817
Energy materials and local area materials

Polk Community College
Hershel Nelson
Winter Haven, Florida 33880
Have teacher made resources

Con't Teacher Made Materials

SIMSOC, William Gamson and Scott Foreman(?)
Excellant role playing simulation exercise on:
social, econ., and political decision making

Wright State University
Dr. Roger Iddings
Dayton, Ohio 45431
Has developed a course and has materials available

Wright State University
Dr. Ronald Schmidt
Division Office of Environmental Studies
Dayton, Ohio 45431

Instructions for letter writing exercises to selected elected officials. Requires student to follow up general "non-response" letters and attempts to pin down officials. This exercise actually resulted in voting shifts by some state legislators.

U.S. Dept of Agriculture will send free or at a minimal charge how to compact your garbage and trash. With this a student gets first hand information on how to do this.